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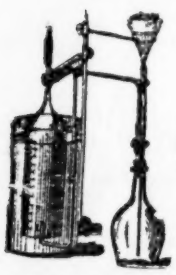

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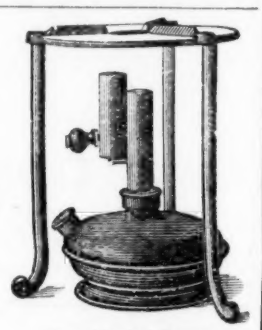

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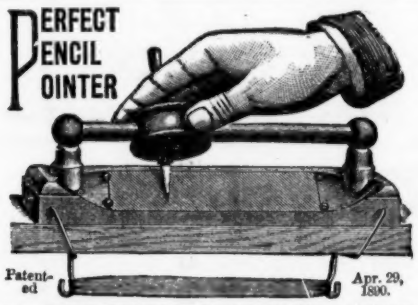

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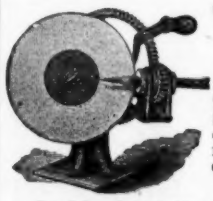

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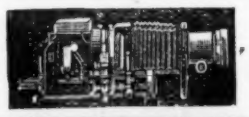

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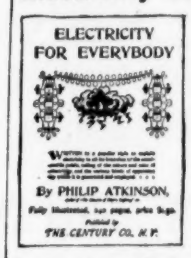

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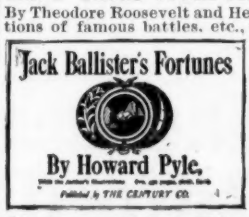

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Vol. XLII. BOSTON AND CHICAGO, DECEMBER 5, 1895. Number 22.

PSYCHOLOGY OF NUMBER.

SYMPOSIUM ON A GREAT BOOK.

PRESIDENT CHARLES DE GARMO,
Swarthmore College, Pa.

Editor Journal of Education: —

You desire, I understand, an estimate of the significance of Dewey and McClellan's new book on the "Psychology of Number." One who reads this little volume must be profoundly impressed with the fact that it scourges with a tireless lash the present number work of our primary schools, charging that it kills the child's spontaneous interest in number, and that it goes far toward paralyzing his mathematical capacity. The experience of the colleges tends to confirm this judgment, since the majority of students look upon mathematics as a grind, even if they are not to a large extent incompetent in this branch as soon as the elements are passed. If this is the case with the flower of high school students, the charge that our present teaching of the subject leads away from, rather than towards, higher mathematics has some confirmation. The thesis that our authors tirelessly maintain is that the "fixed unit" idea of number lies at the basis of most that is irrational in our present number teaching. According to this conception, a unit is just *one thing;* as, for instance, an apple, a splint, a bean, a bird, a shoe peg, a pencil, a finger. This idea may indeed be defended, but its weakness is that it is only an unscientific conception, which the child must quickly transcend, unless he is to mount a treadmill, where he walks, but without advancing. With ingenious and tireless iteration, our authors insist that the unit must be a changeable whole, composed, it may be, of minor units. For money values it may be now the cent, now the nickel, the dime, the quarter-dollar, the half-dollar, or the dollar; it may be the five, ten, twenty, fifty, hundred dollar bill. In linear measurement, it may be the yard, the rod, the mile, the inch, the foot, or any other definite quantity selected. The same is true for units of weight.

The next fundamental conception is that *number*, in the true mathematical sense, arises when a quantity now *indefinite* to the child becomes definite through measurement by the unit selected. In other words, number is a numerical expression of the *ratio* between the measured quantity and the unit of measurement. It is *not* a *thing*, it is a ratio between things.

These two conceptions being accepted, our primary number work is revolutionized. The Grube system of "fixed units," with its limitation to numbers from one to ten during the first year, and with its interest-killing manipulation of shoe pegs and beans, takes its place along with that other "fixed unit," the Egyptian mummy.

Varied measurement takes the place of barren counting, so that when the child has arrived at the real conception of two and three as ratios between quantities and their measuring units, he has already an implicit knowledge of numbers from one to ten, just as Lincoln when he had read the first book of geometry declared that he knew what an argument is. The interest that teachers have tried to arouse while using the irrational Grube system during the first year is quite outside the number idea. They have appealed to interests connected with the *things as such*, not with the numerical relations of things. "If four blackbirds are sitting on a tree, and two more blackbirds join them, how many blackbirds are there sitting on the tree?" This is a type. What if they were humming birds, or even birds of paradise? No inherent interest in number can be created in this way. As a matter of course, when objects are used to illustrate so accidental a thing as their mere number or multiplicity, they lose all the charm that belongs to them when they are contemplated from the standpoints in which they are significant. Our authors are, therefore, quite right when they insist that teachers shall develop an inherent interest in number through activities that reveal more and more clearly the number ideas.

In the second part of the book they have shown in much detail just how the primary work should begin, what ideas it should develop, how the fundamental operations should be taught, and how the "mountain of difficulties" that the pupil ordinarily encounters in fractions need never be encountered at all.

On the whole, the book is so true, so epoch-making, so wholly destructive to a prevalent false method, that criticisms one would feel like making upon a commonplace work may pass into the category of things too insignificant to mention.

CHARLES DE GARMO.

SUPERINTENDENT AARON GOVE,
Denver, Colo.

"Psychology of Number," the recent issue of the International Educational Series, by the Appletons, presents the consideration and study of arithmetic in a new and striking light, especially with regard to the error of the fixed unit theory in our schools, and the earliest steps in teaching arithmetic. That part of the book which relates to the teaching of fractions, percentage, and the so-called advanced subjects, as well as the treatment of the decimal point, is old and has been accepted and approved by the best teachers of arithmetic for many years. For it is true that, notwithstanding the formal and sequential arrangement of so-called subjects in arithmetic by book makers and publishers, the real teacher has long since ceased to use the terms and ceased to undertake the establishment of independent consideration. Percentage and fractions in all the possible phases, and even the subject of division, ceased long ago to be independent topics for teaching arithmetic.

And so one can but regard that part of this book as not new, but exceedingly helpful to all teachers. The philosophical treatment of number followed by the application of the theory and the first steps in the primary school is that part of the book which demands, and will receive, special attention. It would seem that the author, who has so succinctly and plainly expressed himself, deals purely with theory, and that his suggestion as to the application in the first grade of the primary school is not from actual practice, but is what he believes ought to be done in the light of philosophy.

For one, I am disposed, with this as with all other presentations of that which is new in the science of teaching, to undertake the demonstration as promptly as possible of the practicability of teaching first the elements of arithmetic, as the author suggests, doing away with the fixed unit. No schoolmaster at the present day dare accept the theory of the philosopher presented for practice until he or his reliable friends have put that practice into operation. A fair treatment of this theory will be to select a teacher of the primary school, skilled in method and tact, scholarly in pedagogy, philosophical in thought and practice, and ask that teacher with the first new class that presents itself to undertake that line of effort indicated by the authors of the book. This will demonstrate, at least in one case, what can be done.

The book would have been more complete had some evidence in it appeared of the doing of this work. However, preceding practice must come theory, plan precedes execution, and to the mind of a common worker in the schools this book presents some phases that have never before been presented to him, and which bids fair to be of great worth should the outcome be what the authors intimate is probable.

DR. W. T. HARRIS,
United States Commissioner of Education.

To my mind, the most important point in "The Psychology of Number" is the growth of the mind from its first attitude towards number, in which it perceives number only as a simple term, to the second attitude, wherein it perceives each number as one of the two terms of a ratio. To illustrate: The number seven taken simply is taken in its multiplicity, without a reflection upon the unit which is repeated seven times. But the number seven really has as much to do with the unit which is repeated seven times as with the multiple contained in the idea of *seven times*. In what are called the simple operations of arithmetic, the first attitude of the mind suffices. But with the later operations of arithmetic this ratio, which is implicit in simple numbers, becomes explicit. In ratio and proportion this is the case, and more especially in the fraction. A fraction is a quantity whose value is inferred from the ratio of one number to another. In six-sevenths neither the six nor the seven expresses the value taken as simple numbers, but the value is ascertained by considering the relation of the two numbers.

Since ratio involves the consideration of two simple numbers and an act of judgment or inference based on the two simple numbers, it requires a very much more complex mental operation than is found in the consideration of a simple number by itself. A knowledge of this fact is of use to the teacher. It is usual in school to make a transition from simple numbers to fractions by turning fractional parts into integers. For example, an apple divided into four parts gives four quarters. These quarters of the apple are real things, and may be considered by themselves as wholes, as qualitative, for example. A child can count quarter-apples just as well as he can count whole apples, and he has just as clear an idea of one quarter, two quarters, three quarters, four quarters, as he has of one apple, two apples, three apples, and four apples. In this case the fractional idea has been eliminated, or permitted to hover in the background without special attention to it. It is true that this step will help the pupil in gaining an idea of the fraction, but only the careless teacher who does not know the psychology of number will suppose that the child by this process has mastered the fraction. He has not mastered the fraction at this point, although he has made a beginning. A mastery of the fraction requires that the pupil shall be able to think the ratios one-fourth, two-fourths, three-fourths, and four-fourths, laying as much stress on the denominator as on the numerator — keeping in mind the ratio of one of its fractional parts to the whole unit.

Any teacher may test this question by examining the pupil who has made only the first step of learning the fraction on such examples as the following: Multiply three-fourths by three-fourths; divide three-fourths by two-fourths, etc. The teacher will be obliged to make a new series of concrete units of a lower order than those which he has made for the purpose of explaining the fraction. To deal with a fraction of a fraction implies that the denominator, which is suppressed as much as possible in beginning the study of fractions, shall be made as prominent as the numerator.

If it requires one impulse of the mind to think any simple number, it requires three operations of the mind to think a fraction; namely, one impulse for the numerator, a second impulse for the denominator, a

third impulse for the resulting ratio. Those teachers who are most successful in teaching fractions, as I have indicated above, suppress the denominator by changing it into an integer of a lower order and thereby enabling the pupil to solve his problem by simple numbers. It is a process of avoiding or dodging the complex idea of the fraction by a roundabout road. The pupil who has mastered fractions does not wish to avoid the complex thought of the fraction, already having become familiar with it.

It goes without saying that the mastery of a fraction as a fraction gives the mind a power which it did not have when it could manipulate only simple numbers. So it will be throughout the entire science of mathematics. Every new step will give the mind a more potent instrument with which it can arrive immediately at results that require a long process on the part of a mind that has mastered only the first attitude towards number.

This explanation of the difficulty of fractions will, I think, prove satisfactory if it is examined carefully. But there are many teachers who have mastered the art of taking children through the first steps of learning fractions that seem to think that fractions involve no more complex operation in the mind to think them than is required in the thought of simple numbers. They will readily admit that when the pupil passes from simple numbers to fractions he meets with a serious difficulty and is baffled in his mind. It requires their ingenious method to help him over this difficulty. Nor does he get over this difficulty so easily as they imagine. If they will test the pupil in multiplying and dividing fractions, they will find that it is easy to puzzle him. It requires a very long familiarity with the process of turning fractions into integers to make possible an easy transition to the process of dealing with *abstract* fractions or *true* fractions. It is like the process of learning to multiply by counting one's fingers. The counting of one's fingers is a process similar to that of the use of the abacus, which the Chinese employ so deftly. We all know that the child who has adopted the habit of counting his fingers, instead of learning the multiplication table by an effort of the memory, will carry with him a certain weakness in performing operations of multiplication and division for a very long time. The explanation of this is also plain if one bears in mind the distinction made at the beginning of this article. In counting with the fingers each unit is made a concrete unit; namely, a finger. But in the multiplication table each unit is already a number expressing multitude. Three times two is six. Here the *three* is the multiple and the *two* is the unit; the *six* is multiple *and* unit; namely, three 2's. The learning of the multiplication table is a higher stage of thinking as regards quantity than that stage which counts the fingers, or blocks, or the sliding balls on the abacus. The concrete process is indispensable to enable the pupil to grasp the elements. But the grasping of the elements does not give him the command of the arithmetical instrument, tool, or machine. For the multiplication table is a tool of thought, a machine by which the mind does quickly what it can do slowly by the abacus or by counting the fingers. The multiplication table requires and uses a higher range of thinking as regards quantity. It makes new combinations with elements, and these elements are remembered countings.

To take a new and more interesting example of the psychology of number, let us consider for a moment the process of mind involved in multiplying and dividing by decimals. The decimal fraction gives its numerator explicitly, but only implies its denominator. In order to find the denominator of any decimal the mind must calculate the number of places at the right of the decimal point and infer the denominator by some rule; for example, "Call the decimal point one and write as many ciphers to the right of the one as there are places in the numerator." Or one may ascertain the denominator by enumerating the places to the right of the decimal point, calling the first place tenths, the second place one-hundredths, the third place one-thousandths, etc. The point I wish to bring out is that there is a mental calculation necessary in the pupil's mind before he can read correctly his decimal fraction. The numerator only is given him, and from it he must calculate or deduce the denominator. It is perfectly clear that the consideration of the decimal fraction requires at least one more mental operation than the reading of a common or so-called vulgar fraction. After this difficulty is surmounted, the adding and subtracting of decimal fractions is an easy process — almost as easy as the adding and subtracting of simple numbers. But the multiplication and division of decimals by decimals is far more difficult than the multiplication or division of common fractions by common fractions. Tell a pupil who has learned how to read decimal fractions, and also how to add and subtract them, to multiply three one-thousandths by three-ten-thousandths (.003 × .0003), also to divide three-one-thousandths by three-ten-thousandths (.003 ÷ .0003). His total incapacity will appear at once. The good teacher will, of course, proceed to invent circumlocutions (circumcalculations) by which the pupil may reduce this process to that of manipulating simple numbers, and the pupil will gradually acquire the ability to perform the operation, just as the person who has mastered fractions performs it.

I would insist on the importance of knowing the psychology of fractions were it only for the purpose of removing the delusions from the minds of teachers who are skillful in taking their pupils over the beginnings of this subject by training them into habits of translating fractions into operations in simple numbers.

I was reading an article on arithmetic the other day in one of our best educational journals, in which the writer not only failed to perceive the psychology involved in the study of numbers, but he went so far as to mistake concrete numbers for pure quality. Three times six is eighteen, would give us an example of pure quantity, according to him; but three times six apples are eighteen apples, according to the same authority, would be pure quality and not quantity. He did not seem to see that before one can count apples or any real objects, one must be able to distinguish and separate from them the quantity from the quality. "Three apples" is wholly and simply quantitative; for the apples are regarded as quantitative units, or else they could not be counted at all. Abstraction is made of the qualitative phases of the apples and they are regarded as simply identical units. Then they can be counted.

In another article I should like to call attention to the fact that quantity always involves multiplicity in each of its units and a unit in each of its multiplici ties. The units in any sum are always regarded as divisible. It would be impossible to count what is purely qualitative.

John T. Prince, Ph. D.,
Agent Massachusetts Board of Education.

I find myself in substantial agreement with much that is given in "The Psychology of Number," and have no doubt that the book will serve a good purpose in helping to guard teachers against the useless refinements of method sometimes employed. I cannot help thinking, however, that the authors exaggerate the difference between the methods pursued in good schools at present and those which they advocate. No one, for example, would for a moment contend that "objects are number" (page 24), or that number is the "mere perception of things" (page 61), or that number can be "taught by the *mere* presentation of things" (page 32); while most teachers would agree with the authors that "numerical ideas can be normally acquired and numerical operations fully mastered only by arrangement of things — that is, by certain acts of mental construction, which are aided, of course, by acts of physical construction" (page 61).

Again, it seems to me that the authors misapprehend the place that the Grube system has at present, since constant reference is made to that system as a point of attack. I believe I am right in saying that the Grube system is not followed closely to any extent in our schools, nor can I believe that anywhere "a start is made with one thing — endless changes being rung with single objects in order 'to develop the number one'" (page 31).

I admit the importance of keeping in mind the ratio idea of pure number, but I am not yet convinced that the terms *number* and *numbers* should never be used in any other way. Must we speak of a number of blocks as a "measured quantity" or "measured magnitude" (pages 70–71)? And in giving to the children the examples 2×4, $8 \div 4$, must we "properly interpret" what is meant strictly according to the ratio idea? If so, how shall it be done (page 70)?

I believe the authors underestimate the difficulty of practically applying the "Law of Commutation," to which so great prominence is given. While it may be acknowledged that the psychologist and possibly some teachers can see that $\$5 \times 12$ implies $\$12 \times 5$, observation, I think, will disclose the fact that the child cannot see that implication. The child can see that twelve groups of five dollars each contain the same number as five groups of twelve dollars each, but he cannot, I believe, be made to see that the process of finding the aggregate number in the two cases is one and the same. If the authors would assume that an understanding of the "law" is something to reach towards in the elementary course and that the application of it may be made only in the later written work, there would be, I think, a more cordial assent to it on the part of practical teachers.

William A. Mowry, Ph.D.,
Hyde Park, Mass.

I took up this book a few weeks ago with a profound sense of its importance. I had heard much about it, and I believe we are likely to hear much more.

1. Its early pages impressed me very favorably. I said, Now we have the combined efforts of two profound philosophers. Herein is compressed the essence of their life-work upon a subject of the greatest importance. Here in New England, under the leadership of such generals as Francis A. Walker and other commanders of brigades, we have reduced the study of arithmetic below any respectable minimum, while in the Keystone state the large boys in the district schools, academies, and normal schools are spending long winter evenings in wrestling with strong problems involving the higher rules of arithmetic and algebra, geometry and surveying, and all under the guise of arithmetic pure and simple.

Now this book will settle all principles, harmonize all conflicting theories, and give us the keynote for the true psychological methods of teaching arithmetic. As I read along I was more than delighted. First of all, Dr. Harris, the accomplished editor, says some excellent things in his preface. He never says anything but excellent things. "No subject taught in the elementary schools taxes the teachers' resources as to methods and devices to a greater extent than arithmetic." "Methods must be chosen and justified on *psychological grounds*." "Train the mind of the pupil into this consciousness of the *ratio idea*."

In the first chapter we find, "What psychology can do for the teacher." This chapter is excellent. But when we come to the second chapter and the authors commence to discuss "the psychical nature of number" then my trouble begins.

2. Here I find a kind of Eastern juggling with words, such that I cannot understand it. I am confronted with a statement that is repeated and reiterated throughout the whole work; viz.: "Number is a rational process, not a sense fact." This, certainly is new philosophy. Number is not a fact, apprehended by the senses, but a *rational process*. Now, a *process* is continuous, progressive. So a number is continuous, progressive. *Rational* implies reasoning. Hence *number* is a reasoning continuousness, or progressiveness. Webster defines number as "that which admits of being counted or reckoned." "Quantity, regarded as made up of separate things."

The Century dictionary puts it this way: "Quantity, or amount, considered as an aggregate of the individuals composing it."

But this must be the old-fashioned way of looking at it, and unless we adopt the new meaning, we shall be considered antiquated. It may not be unlawful to suggest that much pioneer work will be needed before the mass of our teachers in the States and the Dominion will be able to discard the time-honored meaning and use naturally and intuitively the new definition.

The authors further say: "The mere fact that there is a multiplicity of things in existence, or that this multiplicity is present to the eye and ear, does not account for a consciousness of number" (page 22). Certainly not. "The mere fact of a multiplicity of things" cannot account for "*consciousness.*" Had the authors said "*Consciousness* of number is a rational process," a gleam of light might, perhaps, have been discovered in the darkness. But here is another definition of number: "Number is a product of the way in which the mind deals with objects in the operation of making a vague whole definite." One almost wants to ask whether this definition is, on the whole, "vague," or "definite."

The third chapter begins thus: "Admitting, then, the psychical nature of number, we are now prepared to deal with its psychological origin" (page 35). The "psychological origin" of number. The *origin* of number is enough, but the "psychological origin" of number puzzles me. Did not number always exist? Has some Fulton, Morse, or Edison invented number? Did its existence depend upon the consciousness of number by the human mind?

There are many statements in the book difficult for the ordinary mind to understand. "When we count *we measure,*" and "when we measure *we count*" (page 48). "When we say ten apples, five books, six horses, etc., we measure some whole, some *how much*, by counting its parts, the *how many;* but we do not know just how much one of these parts or units is. If we knew the exact size, or weight, or price of the book or apple, we should have a more accurate measurement and a more accurate valuation." Again, "It is a great pity that our authorities use these unmeasured units so much, particularly in fractions. Half an apple, half a pie, is a practical, not a mathematical, expression at all. To make it mathematical we should have to know how great the whole is, how many ounces or cubic inches" (page 49). I respectfully submit that "ten apples" means "ten apples" in *number*, whether the apples be large or small, sweet or sour, ripe or unripe. "Here are *ten apples*" — this asserts two things — they are apples (not pears, or peaches). There are *ten* of them. Their size, weight, color, or quality, has nothing whatever to do with the number of them. The expression "half a pie," "half an apple," is absolutely, fully, completely, "a mathematical expression," and you cannot make it one iota more mathematical by knowing "just how great the whole is — how many ounces or cubic inches."

In a similar way, the authors say: "Quantity is limited quantity, and there is no quantity save where there is a certain qualitative whole or limitation" (page 57). Again, I must try to imagine what "quality" has to do with "quantity." Is not *quantity* one thing and "quality" absolutely another thing?

I puzzled a long time over the following sentence. I read it over and over again. I cut it up into four sentences, and I believe it expresses the authors' thought. Rhetorically, however, it is a little difficult: "Avoid the interest-killing monotony of the Grube grind on the three hundred and odd combinations of half a dozen numbers, which thus substitutes sheer mechanical action for the spontaneous activity that simultaneously develops numerical ideas and the power to retain them" (page 148). Think of Benjamin Franklin or Abraham Lincoln writing such a sentence! It is a sheer impossibilty.

Discrepancies appear here and there. The authors find themselves using terms now and then, just as other people do. On page 241 we find another statement of number — "Number depends upon measurement of quantity." Good!

But time would fail should one attempt to follow out what seems to be bare and bold fallacies, arising from a few preconceived notions concerning number. The main attempt apparently, is to belittle, to discount, to hold up to ridicule, the famous "Grube system," so called. This system, so far as I know, is, in its entirety, used scarcely anywhere in America. But a great logical truth underlies the Grube system, which is every day gaining ground among the best teachers of arithmetic in America. The clearness, accuracy, and *interest* that result from knowing eight before proceeding toward a "vague idea" of nine and ten, have brought multitudes to teach elementary number after this fashion. I have had somewhat large opportunities to observe methods of arithmetic teaching, and I cannot recall any place where the Grube system is used (unless it be in St. Louis) after the second year's work.

3. The book is two books, but radically incomplete in both parts. The first part is a fragment of a treatise upon psychology, and the second part is a very incomplete hand-book on methods of teaching arithmetic. The very title of the book involves us in obscurity — "The Psychology of Number." Psychology is the science of the mind. So the book is entitled "The Science of the Mind of Number," whatever that can mean.

4. The second part discusses, in a very desultory and incomplete fashion, methods in dealing with number and numerical operations. Here are many suggestions, some of them old and some new. Some are good and some are valueless. Scores of books on teaching arithmetic may, possibly, be found which would prove quite as useful in this respect, and concerning which, doubtless, some would claim that they were more philosophical, at least more mathematical.

The book, as a whole, is a thoughtful discussion of an important subject. It will find strong friends and supporters, and will, doubtless, receive more or less adverse criticism. The result will be a larger attention to arithmetic in the schools, with better methods of teaching. Every discussion of this sort operates to the advancement and the uplifting of our grand American system of public schools.

WILL S. MONROE,
Boston, Mass.

In referring to Niagara Falls some years ago, Mark Twain remarked that either the hotel rates at Niagara or the falls themselves would have to be lowered. Messrs. McClellan and Dewey in their new book on the "Psychology of Number" seem to have reached a not dissimilar conclusion in regard to the beginnings of arithmetic as a school study — either a modification of our conceptions of number, or its relegation to a comparatively subordinate place in the course of study.

The tendency to group school studies into two classes — studies which furnish the materials of thought, and studies which furnish the symbols of thought — has resulted in the deprecation of number, on the ground that it is merely formal in character. On this point the authors take issue with present tendencies. Paraphrasing an often-quoted saying of Kant, they remark: "While form without content is barren, content without form is mushy. An education which neglects the formal relationship, constituting the framework of the subject matter taught, is inert and supine."

The dependence of number on measurement and of measurement on the adjustment of activity is the central thought of the book. Number is simply measurement of quantity, duration, valuation, etc.

Number ideas are alike imperfect in the child and the savage so long as they live only in the present and recognize no pressing demand for the adjustment of means to an end. When necessity requires them to arrange their acts in a certain order, to measure, compare, and select, they adjust their means to accomplish a definite end. This is the origin of quantitative ideas: it is the process of measurement — of valuation — based upon means to an end. But number is more than the rough estimate of the value of certain things to some end: it is the exact measurement, the definite valuation of a quantity coming within a prescribed limit.

The mind in its stages of development, beginning with vague estimates of size, bulk, and value, works through the indefinite how much to the definite so much. The American Indian measures distance by suns and time by moons. He measures by a unit of action, but by a unit that is not itself measured. And not until his unit — sun and moon — is accurately defined does he pass from vague quantity to exact numerical value.

Although the accurate measurement of a unit is reached only by its measurement of the same kind of quantity, the unit may have a defined relation to a different kind of quantity. It may also measure quantity in terms of quantity unlike in kind, but in some one respect alike. These three stages in the process of measurement are thus summarized by the authors: —

1. Measuring with an undefined unit.

2. Measuring with a unit itself defined by comparison with a unit of the same *kind* of quantity.

3. Measuring with a unit having a definite relation to a quantity of a different kind.

The unit according to this conception is always regarded as a unit of measurement — of dollars, inches, or pounds — and not as something fixed. It is a unit because of its utility in the measurement of valuation, length, or weight. Regarding the unit in this light attacks at its foundation the Grube method, with its fixed unit. Messrs. McClellan and Dewey have given us a logical and forcible statement of the faith that is in them, and, in the opinion of the writer, they have rendered an incalculable service to the cause of education in general and the teaching of number in particular.

GEORGE P. BROWN,
Bloomington, Ill.

This volume begins with a chapter on "What Psychology Can Do for the Teacher," in which the basal idea of the work is clearly set forth. This idea, stated in brief, is that any study, as geography, for instance, is a group of facts selected and classified on the basis of some interest, some urgent need of mankind, and, therefore, some interest of the child. "Unless the fundamental interest and purpose which underlie this classification are discovered and appealed to, the subject which deals with it cannot be presented along the lines of least resistance and in its most fruitful way. This discovery is the work of psychology. In geography we deal with certain classes of facts from the standpoint of their influence in the development and modification of human activities. A mountain range treated simply as a mountain range gives us geology; treated in relation to the distribution of the genera of plants and animals, it has a biographical interpretation; treated as furnishing conditions that have entered into and modified human activities,— mining, grazing, lumbering, etc.,— it requires a geographical significance."

The unity of geography is a unity of human action — a certain human interest. It follows, therefore, that this study must be presented in such a way as to appeal to this interest. The way in which it interests grown-up people determines the way in which it must be taught to children. What is true of geography is true of arithmetic.

The function of psychology, it may be repeated, is to set forth the process by which the human race has discovered the different groups of facts that make up the school studies; which process is substantially the same as that which the child must pursue in mastering them. The school exists to lead the child over the different stages of the growth of the race in the shortest time.

Why did mankind ever create *arithmetic?* Because a need was felt of dividing up things — imposing limits. If every one could have had all he wanted of everything, the need of measuring things would never have been felt. But that need was experienced early in the history of civilization.

There are two questions involved in measuring, one is "How many?" the other is "How much?" and both must be answered. In measuring, the first act is to apply some unit of measure to a vague, indefinite,

unmeasured whole. A basket of eggs must be separated into dozens. In this case a dozen is the unit of measure, and the "how much" is obtained by finding the *number of times* the "how many" — the measuring unit — is found in the basket of eggs. The mental process is: First, an instantaneous and unconscious synthesis resulting in the vague idea of a "basket of eggs" (how much); second, the analysis of this mass into parts by applying the measuring unit — one dozen eggs (how many); third, the synthesizing of these into a definite "how much," or measured quantity. This is the mental process in every measurement: (1) a vague whole; (2) analysis; (3) a synthesis giving a definite whole composed of distinct parts — multiplicity in unity. If my measure, a dozen eggs, is a unit, my basket of eggs may be called a unity. This form of measurement we call *counting*. It does not always give a definite "how much," because the measuring units are not always *equal*. It would be more exact to sell eggs by the pound. In that case the "how many" of the measuring unit and the "how much," or quantity, would always be the same.

Such being the measuring process, what is that in it which we call *number?* Evidently, number is the *times* the measuring unit is applied to the whole to be measured. This analysis disposes of the false notion that number is a sort of physical, external attribute of an object. Number is a *relation*, pure and simple; "the *repetition* of a certain magnitude used as the measuring unit to express the comparative value of a magnitude of the same kind." Sir Isaac Newton and Euler long ago defined number as the *ratio* of one quantity to another taken as a unit. A ratio is a *relation seen*. It is a purely psychical thing. It is psychologically true, therefore, and true in every other way, that "number is not got *from* things, but put *into* them." But for the felt need of measuring things, the conception of number would never have been created by the mind.

The, to many, rather startling proposition to which these conceptions lead, is that there is no such thing as number, except when the mind conceives of a measuring unit as actually employed in measuring some quantity. Number is a relation; no relation can exist apart from the things related.

The idea of a "fixed unit," which is the basis of the "Grube method," and which is assumed to be true in most text-books on arithmetic, is erroneous, and leads to dead mechanical teaching, uninteresting, because not understood by either pupil or teacher.

The ratio idea involving the three ideas of (1) *quantity* to be measured; (2) *measuring unit;* and (3) *times* the latter is found in the former, is implicit in addition. It is more explicit in multiplication and division, causing the "factor relation" to take the place of the relation of *parts*. In fractions, this ratio is fully expressed with all the terms present.

The seventh chapter of this volume contains a very clear and convincing discussion of the notion that prevails among teachers of arithmetic that there are two kinds of division, called partition and division proper. Those who have hitched their arithmetical wagon to that star will do well to study this analysis with especial care.

The hardest blows dealt upon a prevailing practice are those directed toward the notion that children must master the combinations of the integers to ten before undertaking those using the larger numbers from ten to twenty. This whole theory of the *mastering* of these combinations of smaller numbers is a natural sequence of the fundamental error in the Grube method, and must fall with that method. It is clearly shown, too, that the modern idea of exhausting all the fundamental operations in the study of four, for example, treating it by the processes of multiplication and division, as well as of addition and subtraction, is unpsychological. The old method of teaching multiplication and division, *after* the processes of addition and subtraction have been studied, is nearer the truth.

The authors say: "It seems clear, therefore, that the fundamental operations, as formal processes, should not be all taught together; on the other hand, rational use should be made of their logical and psychological correlation. It is one thing to perform arithmetical operations in such a way as to *involve* the *use* of correlative operations, and it is another thing to force these operations into consciousness, or to make them the express object of attention. The natural psychological law in all cases is, first, the use of the process in a natural way, and then, after it has become familiar, abstract recognition of it."

We have called attention very briefly to the psychological analysis of the process of the growth of the number idea which this volume contains. The last ten chapters discuss the different numerical operations involved in the study of arithmetic. The reader who has seized the psychological theory may be left, very properly, to apply it for himself. But these chapters are interesting and very suggestive, and grow out from the tap-root of the whole matter, that number is only possible when there is something to be measured and a measuring unit. All numerical operations and manipulations of number symbols must go back to this idea for their final explanation.

The writer regards this book as a contribution of great value to our professional literature. It reaches much farther than the teaching of arithmetic. It elaborates a psychological method which applies equally well to the teaching of any subject. The fundamental thought that all the knowledge of the race has grown in response to some felt need of the race is of transcendent importance in directing the teacher to the discovery of a process of teaching every subject that will awaken in the children a similar interest to that experienced by those who felt the actual need of this knowledge in their efforts to live, and discovered it in response to this call. This is the kind of interest that those earnest students, styled Herbartians, for want of a more appropriate name, are advocating; interest in the subject itself because of its close relation to human life.

SUPERINTENDENT J. M. GREENWOOD,
Kansas City.

The volume bearing this title is the joint product of two minds, or the product of one mind endorsed by the other. Its contents are in harmony with the two main ideas,— psychology and number,— running through the volume, and the fact is emphasized on almost every page. I do not now recall another book of a didactic character that is so insistent on sticking to the literal text as this one. The authors pound away at it with a vigor and a determination worthy of the subject. They have set in a strong light the science of arithmetic and how to teach it, and the many teachers who have been carried off their feet with the idea that arithmetic can be learned incidentally, or as the tail-end of something else, will find the absurdity of such a notion completely demolished in this treatise.

Whether there is as much psychology in number as the authors maintain, may well be doubted; but, if it be a little extravagant in this respect, it is extravagance certainly on the right side and in the right direction. Again, the authors burn with indignation when speaking of the silly methods in vogue in teaching arithmetic, and, in consequence of their feelings on this subject, they slash right and left, apparently not content with dashing into fragments the objects of their disgust. They actually belittle them afterwards from the psychological number standpoint. Here I join hands with them most heartily, as in nearly everything else they have so well said. Their test in all cases is: What does the psychology of number show when this or that process is tested by this infallible guide? The reader should keep this measuring standard with him every moment while reading the book. Of course, a question exists as to whether the authors have really got hold of the entire test, rod, machine, or whatever it may be; or whether they have cut off a little piece of it, and are using a part of a part for the whole. Without affirming or denying at this time, I will say that a doubt suggested itself to my mind on this point, and it still lingers. By seeing the stump, I can very often tell what the tree must have been,— perhaps in a general way.

Then it may be questioned, just a little bit, whether "number is a rational process, not a sense fact." In the incipient stage I incline to the opinion that it is a combination. While the shepherd dog cannot count 10,000 sheep, yet, if one gets out into another flock, the dog will pick that one out and chase it back where it belongs. He knows the sheep, and he seems to know all the other sheep of the flock he watches. Neither is it quite evident that the energizing power of the mind itself is *number*. To get at the elementary idea of number, there must be the material thing, as well as the mind to see the relation existing between the thing itself as the unit and the symbol with which the mind works; otherwise, that strange phenomenon would exist of the mind's nourishing itself on its running activity. As I look at it, the mind acts on what is presented properly to it, and in virtue of this action, not on itself, it acquires knowledge. Whether the authors mean this, or something vaguely approaching this, I am puzzled to know; but if they do, I think their interpretation is too narrow, psychologically. It would be hard to prove that number is an energy of the mind, unless energy be defined somewhat differently from the usual meaning attached to it; but if we say energy is the inherent power the mind has to do work when it has something to work on, and to systemize the product into a whole, then the use of the word is consistent with the facts.

But I demur most emphatically to the mind's spinning arithmetic out of its own energy, without the presence of the necessary internal or external material upon which to work. There may be an instrument so constructed as to be capable of racing with itself in the air, but I doubt if the human mind is such a one. And as I have already said, this may not be what the authors had in mind; but, nevertheless, this is the vague idea I got from the book.

Any student of education will be well repaid by a careful perusal of this book from the title page to "The End," page 309. I endorse the book most heartily. Even the small obscurities I have referred to may, with a little more light, be as plain as "Fichte's Sun-Clear Statement."

The practical applications of the principles upon which the psychology of number depends is the feature that will most heartily commend itself to the progressive teacher. The suggestions on methods of treatment are, in the main, excellent as to the principles underlying the science, although the arrangement of the actual work itself is sometimes straggling. All solutions should be models of neatness, as well as of accuracy. Perhaps, had the authors been familiar with the best forms of arithmetic work as it is practiced in the most progressive schools of this country, they would have given neater specimens. This does not in the least detract from the real merit of the book; but a different presentation would have added materially to its influence as a model for teachers.

The keynote in the discussion is reached by the authors when they assumed the standpoint of *measurement* and *varying unit*. Instead, however, of dwelling so fully upon the *exact measuring unit* in each case, as the authors saw fit to do, the proposition may, I think, be changed into another form, which is more universal in its application; namely, comparing one number of quantity with another. This is an extension of the meaning *measuring*, which the authors, as I conceive it, had caught some glimpses of, but had not yet worked out. *Comparing* is the fuller conception, whether used concretely or abstractly.

To illustrate this phase more fully, suppose one has placed on the board the following groups of figures: —

4	4	4	4	4	4	4	4	4	4	4	4
—	4	4	4	4	4	4	4	4	4	4	4
4	—	4	4	4	4	4	4	4	4	4	4
	8	—	4	4	4	4	4	4	4	4	4
		12	—	4	4	4	4	4	4	4	4
			16	—	4	4	4	4	4	4	4
				20	—	4	4	4	4	4	4
					24	—	4	4	4	4	4
						28	—	4	4	4	4
							32	—	4	4	4
								36	—	4	4
									40	—	4
										44	—
											48

Suppose such questions as how many fours in 8? in 12? in 16? in 20? etc.

Four is what part of 8? of 12? of 16? of 20? etc.

Eight is what part of 4? of 12? of 16? of 20? etc.

Thus, continue to measure all the numbers by each of the others. This will introduce the idea of parts, or fractions.

Let this be applied to percentage now, as well as to fractions.— The authors have done well in putting percentage in with fractions where it properly belongs.

Four is what per cent. of 8? of 12? of 16? of 20? etc.

Eight is what per cent. of 4? of 8? of 12? of 16? of 20? etc.

Again, suppose we take 48, and measure each of the other numbers by it; and so on with each of the other numbers in turn.

If the teacher wishes to go a little deeper, and asks the pupil how he would prove these abstract relations, or what he is thinking of when he says that 48 is $\frac{4}{11}$ of 44, is $\frac{6}{5}$ of 40, is $\frac{4}{3}$ of 36, is $\frac{3}{2}$ of 32, is $\frac{12}{7}$ of 28, is twice 24, is $\frac{12}{8}$ of 20, is 3 tines 16, is four times 12, is six times 8, and is 12 times 4, his replies are illustrated thus: —

He draws a rectangle on the board, dividing it into forty-eight smaller rectangles, and he shows how these answers, whether as fractions or percentage expressions, correspond to the diagrams.

That is, a subject, if properly developed first, is always easy for children to get hold of, and this fact has been ably presented by the authors.

Grouping processes that are virtually identical, while indicated in different chapters by the authors, were not carried out in detail as much as should have been done, and it is in this direction that the modern idea of correlating the sub-divisions of a subject should receive much direct, practical attention.

When a pupil is learning in the lower grades how to add fractions, why not teach him how to take one fraction from another at the same time? There is no difference in the processes, except the difference between addition and subtraction,— *a sign*. Again, when the pupil is learning multiplication, having a little knowledge of dividing a number into parts, as shown in previous exercises, why not teach him how to multiply a denominate number, such as reducing yards, feet, inches, to inches, as easily as to have him multiply one abstract number by another? The same plan may be pursued in teaching division. That is, all addition is akin; all substraction; all multiplication; all division. There is neither reason nor justice in keeping pupils nibbling at these subjects for years, when it can all be done in half or two-thirds of the time now devoted to the subject.

I do not take much stock in the title which the authors chose,— "Psychology of Number"; but I invest heavily in the subject matter, and I am glad, indeed, that they have applied so much "common sense to the science of arithmetic and how to teach it."

There is not an arithmetical series in this country that meets fully the requirements set forth in this book; but there should be such a series prepared and published. For one, I am indeed glad that two gentlemen occupying the positions these authors do felt impelled to place before the American teachers this subject in its true light and in its proper place in a scheme of education; and, furthermore, that they are not hide-bound and hampered by schoolmaster traditions, which would keep a boy working with shoe pegs, toothpicks, etc., when he could carry fence rails.

To the authors I lift my hat and say: "*Well done.*"

SUPERINTENDENT T. M. BALLIET.
Springfield, Mass.

I am glad to respond to the invitation of the JOURNAL to contribute a brief criticism of this recent addition to the International Educational Series. The literature on this subject in English is so limited that every contribution of any value should be heartily welcomed.

That psychology must furnish the basis of educational method is now so generally recognized that no apology is needed either for the book or its title, and the first chapter might have been omitted. In the second chapter, the authors discuss with great ability and force the "psychical nature of number." The burden of this chapter is to prove that there is no such thing as "number perception" — to use a current term — in the same sense in which there is a perception of color or of sound; but that the idea of number is a product of the mind, and arises from or in the mind's efforts to make a "vague whole definite." The act of numbering is an act of measuring, of defining the indefinite. This idea, that we see and hear number as we see objects and hear sounds, is one that is still widely prevalent, and one which frequently drops out in public addresses at teachers' conventions and in articles in educational papers. A simple analysis of the conditions of an act of sense-perception ought to make it clear that number cannot be literally perceived by the senses. The eye can see only what can send waves of ether of a certain kind to the retina. Number obviously cannot do this. The ear can hear only what can produce waves of air of a certain kind. Number cannot do this. And so with the other senses. "*Number* is not (psychologically) got *from* things, it is put *into* them." "Number arises in and through *the activity of mind in dealing with objects.*" Hence, the perception of *things* is not always a guarantee for the presence of number concepts in the mind. This chapter will prove of great value to teachers.

The fifth chapter deals with the "Definition of Number." Number, it is argued, arises from measuring one quantity by another, or conceiving one quantity in terms of another. Number, therefore, "*always* expresses ratio; *i. e.*, the relation which the magnitude to be measured bears to the unit of reference." The authors quote Newton and Euler to the same effect. This chapter is a very interesting one from a mathematical point of view, and is of some consequence in its bearing on teaching elementary arithmetic; but it does not have, it seems to me, the significance which the authors appear to assume that it has. Whether a group of three boys ought to be regarded as *three boys* or as *three times one boy*, is not a question which is going to revolutionize the teaching of primary arithmetic. The fact that "there must be something wrong with the town clock, because it has just struck *one three times*," was discovered long ago by a man who reached home at that unseasonable hour in the morning, and I am not aware that his discovery has materially modified mathematical teaching.

The chapter on "Division and Fractions" has many good points in it. The position which the authors take, that fractions and integers are virtually identical in their nature, is a sound one, and will be endorsed by a large number of teachers throughout the country, only one cannot help but wish that the application of this thought farther on in the book were worked out better. I fear the practical treatment of this subject as outlined in this book would scarcely lead the pupil to suspect that fractions were as simple as whole numbers. The discussion of it is mathematical rather than pedagogical. "The inch may be defined from $\frac{1}{12}$ foot, the foot from $\frac{1}{3}$ yard, the ounce from $\frac{1}{16}$ pound, the cent from $\frac{1}{100}$ dollar," etc., but I doubt if it would make the inch, the foot, the ounce, or the cent any clearer or more definite than it was before.

The first half of the book deals with the psychology of number, and is by far the most valuable portion of it. The next forty-five pages treat of "Primary Number Teaching," and contain a great many suggestions which must be helpful to the teacher. The last hundred pages contain absolutely nothing of value (except two or three happy devices) that cannot be found in almost any old arithmetic. It discusses the traditional topics in the traditional way, and it is difficult to see any good reason why the book should not have ended with the ninth chapter. This last portion of the book is not up to date. The best schools of the country have long since passed beyond the kind of work it outlines, though many of the current text-books have not. The treatment of "Decimals," of "Percentage," of "Least Common Multiple," of "Greatest Common Divisor," of "Square and Cube Root," is simply that of the older text-books, and none of the newer methods of teaching these subjects are suggested.

The book is somewhat controversial in character. It claims to prove the "Grube Method" to be fundamentally wrong, and some of its criticisms of this popular method are forcible and unquestionably true. The Grube method, "pure and simple," as Grube taught it, has many defects in matters of detail, which have not yet been wholly eliminated from it even in good schools. I fear there are still teachers who "develop the number 1" in school, as Grube did; who have special "methods for teaching the figure 6," as the authors of this book suggest; and teachers who still drill children on "$1+1+1+1+1+1+1+1+1=9$." In our best schools these ludicrous details have been discarded, with many others less absurd.

But the authors assume more than is here granted; they attack what they regard as the "fundamental errors" of the Grube method. They speak of their own method as the "True Method" (page 86), the "Rational Method" (pages 149, 156), the "Psychological Method" (page 156); they refer to the Grube method as a "non-psychological method" (page 173), speak of "the fundamental fallacy of the Grube method" (page 83), and caution teachers against "the interest-killing monotony of the Grube grind" (page 148). These "question-begging epithets" are scattered through the book and indicate the controversial tone of it.

To what extent are the criticisms of this book on the Grube method just? Many teachers of the Grube method teach and drill upon a great many combinations which it is wholly unnecessary to teach in a formal way. Drilling a class on $2+1+3+1=7$, or on $5-1-1-1-1-1=0$, or on $8\div 1=8$; or to introduce prematurely such processes as $\frac{1}{3}$ of 5, $7\div 5$, etc., is a kind of work which deserves the severest criticisms of the authors of this book. It is not true, however, that the exhaustive teaching of all possible combinations in each number from 1 to 20 is any essential part of the Grube method. The combinations to be taught are such as occur frequently in the pupil's subsequent thinking with numbers. The facts to be taught in addition and subtraction are clearly stated by the authors themselves on page 186. The combinations to be taught in multiplication and division are those which occur in a multiplication table and an old-fashioned "division table."

The essential feature of the Grube method is the fact that it makes *numbers*, and not *processes*, the basis of teaching elementary arithmetic, and that it begins with the small numbers, which can be visualized (or, to be accurate, which can be thought in connection with groups of objects so small that they may be visualized). Each number becomes a "unit of thought," or "unit of measurement," for each higher number. Each number should be treated as a "unity to be measured," and later as a "unit of thought" to measure other unities. The authors contend that the Grube method does not do this. They speak of "the ineradicable defect of the Grube method, . . . which conceives of a unit as one thing, instead of as a standard of measuring. . . ." It is of the very essence of the Grube method that the smaller numbers must be made the units of thought, in terms of which the higher numbers must be conceived, and on this point the criticisms of this book are not well taken. The smaller numbers are to serve as "apperceiving concepts," and be the means by which the mind may master the higher numbers. It is for this reason that the method insists on the thorough teaching of the essential combinations in the small numbers.

The authors even concede this point in part. Their grief seems to be that children spend the greater part of two years on the numbers up to 20 or 30. To hasten the pupil on to the higher numbers, they would make a bee-line for the number 10; then use this number as a "unit of measurement," and teach all the multiples of 10 up to hundreds and thousands. This can easily be done, and it is usually done by good teachers when pupils have reached 20, and before the other numbers between 20 and 100 are taught. The

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A. E. WINSHIP, Editor.
W. E. SHELDON, Manager of Advertising Dept.

multiples of 10 are by far the easiest numbers to teach between 20 and 100. But what is gained when they are taught, if the child is unable to handle the other numbers? How much thinking can be done with these multiples? The gain is far more apparent than real.

The authors of this book would avoid the thorough teaching of the combinations from 1 to 100, as required by the Grube method, by having the pupils learn objectively the combinations in multiplication and division from 1 to 10; then illustrate objectively, once or twice, the combinations in addition and subtraction, and memorize them with the help of figures; after that they would have the pupils construct their own multiplication table and memorize it. This is going back considerably more than half way towards the mechanical teaching of elementary arithmetic of twenty-five years ago.

The teaching of a combination in primary number work involves four steps: First, the objective presentation of the combination; second, the repetition of the objective presentation, or the visualization of it, in order to make the concrete thought familiar to the mind; third, the teaching of the symbol; fourth, drill upon the oral and written expression of the combination. The authors would drop out the second point, and thus cut short the process. This would indeed be a gain, if the main object were to have pupils memorize the combinations. It would be a still greater gain, in time, if the first two points were omitted. But the main object ought to be to give pupils the power of thinking in number, the power of readily seeing conditions in a problem, relations between conditions; in short, the power of reasoning with applied numbers. The main question with the teacher ought to be, not "How soon can I bring my pupils to memorize the combinations of the smaller numbers?" but rather, "How may I teach these combinations so that pupils may gain the greatest power of thinking?"

This article has already transgressed its prescribed limits, but I must refer to one more point. On page 148 there is this caution: "Avoid the fallacy of assuming that the child, to know a *number*, must be able to picture all the numbered units that make up a given quantity." This is an important half-truth. As to whether a child does know a number or not, unless he can visualize the quantity numbered, depends on what the number is. If it is one of the numbers from 1 to, say, 10 or 12, he ought to be able to visualize the quantities readily, either as a solid group, or as a group of groups. There is good reason for making the limit higher than 12. If the number is 50 or 150, no mind can visualize the quantity, and it would be absurd to attempt it.

There is an analogy between the teaching of the numbers up to about 20, and the teaching of what we call "home geography." The purpose in either case is to develop a group of very clear apperceiving concepts with which larger unities may be measured and apprehended. To insist that a large number like 572 ought to be visualized, because a small number — or the quantities numbered — must be visualized, would be as absurd as to say that a pupil must be able to visualize a country like Switzerland as minutely in detail as he ought to be able to visualize the schoolyard. The analogy is imperfect in that it suggests even vague visualization in the case of large numbers, but it serves the purpose of making the point clear.

SUPERINTENDENT G. J. LUCKEY,
Pittsburg, Penn.

Editor of Journal of Education: —

I have examined with great pleasure "The Psychology of Number," and rejoice with exceeding great joy at its publication.

The great difficulty in the schools to-day is that in number-work pupils are considered as parrots, to be trained as unthinking beings to say and do certain things.

Under present methods of teaching arithmetic more time is taken and less thought developed than in presenting any other subject, and yet a majority of teachers in our schools vainly imagine that arithmetic, as commonly taught, is the principal agent in developing the child's reasoning faculties — vain delusion. It is the most potent agent in wasting the precious hours of youth.

I greet the appearance of this book, because it will dispel the present prevalent erroneous notions which *teachers* have on this subject.

G. J. LUCKEY.

DR. E. E. WHITE,
Columbus, Ohio.

Editor Journal of Education: —

I was rash in promising, in advance of its receipt, a review of the "Psychology of Number" for the JOURNAL. Unfortunately, the book reaches me at a time when other pressing duties forbid its careful study, and I find that it cannot be read in an evening. The most that I can do in the time at my disposal, is to give impressions occasioned by its somewhat hasty reading.

I was, at first, a little puzzled over the title, but as I read on I saw that the authors were in earnest to show that number has a psychological genesis, or origin, and to make the result reached the basis of a theory and method of teaching number. To prepare the way for such an attempt, the first chapter is devoted to a presentation of the practical value of a knowledge of psychology to the teacher. If psychology be limited to the facts of consciousness, to what may properly be termed the *science* of psychology, few scholars will question its pedagogical value. But I find myself increasingly discrediting the practical value of the *philosophy* of psychology to teachers as a class. The present attempt to impose a German philosophy of a unique character on American teachers is sure to end in confusion and loss in school work. Scores of ambitious teachers are now struggling in philosophy beyond their depth, and some are in distress because their blind attempts to apply it in teaching are unsuccessful. How often, Mr. Editor, do you hear an institute instructor, who is to give a few lessons on the teaching of reading or number or drawing, start off with a half-hour's floundering in what he supposes to be the philosophy or psychology of the process? What the teacher needs is a clear knowledge of *psychical facts*. The philosophy of these facts may well be left to philosophers — at least until they reach some practical agreement.

The succeeding chapters on the "Psychical Nature of Number," the "Origin of Number," etc., have been slow reading, and I reach the end not at all sure that I see their practical value. Of course, the idea of number is psychical - all ideas are — and this idea must have its genesis in psychical activity. No ideas are thrust into or impressed upon the mind. All ideas are the products or results of the mind's activity. It also seems unnecessary to show that the idea of number is not the result of "the mere use of the senses." We must confess that we do not get a very clear idea of the nature of number from the definition. "Number is the product of the way in which the mind deals with objects in the operation of making a vague whole definite." Indeed, I am not a little confused by the number of expressions used to show that number is a psychical result *of measurement*. It is defined as "the product *of a way*," "a mode of measuring value," "the repetition (psychical) of a certain magnitude," "a mental operation concerned in measuring quantity," "the product of a mere repetition of a unit of measurement," "the ratio of the measured quantity to the unit of measurement," "the instrument of measurement," etc. We are puzzled to see how a number can be all of these things, and yet this may be made clear by more careful study. Is any psychologist wise enough to say that the idea of number always and uniformly arises in the human mind as the result of the process of measurement? It is obvious that it could be so occasioned, but is the process a *psychical necessity* to the idea of number? I am still in doubt on this point. I have the suspicion that the idea of number is in the mind *before* that of measurement.

It may be true, as asserted, that "number is not got (psychologically) from things," but is it "put into things"? Number may not be "an attribute of things," but is there not a fundamental relation between things and the number the mind "puts into them"? Can the mind, at pleasure, put the number *five* into *three* objects? It is, of course, a crude view of number that makes material objects numbers, as is sometimes done by primary teachers, but is there not a *threeness*, to use Dr. Thomas Hill's expression, in a group of three oranges? Does the mind put this threeness into the group? Does it not, rather, perceive it?

There are two old theories of number; one defines number as the measure of the relation between quantities of the same kind, or, more briefly, the ratio of like quantities. The other defines number as one or more things of the same kind, or, better, the *oneness* and *moreness* of things of the same kind; and it is in this latter sense that the term is generally used in mathematics, and it seems too late to rule it out successfully.

Nor are these two theories mutually exclusive. The number eight, for example, may be considered as the ratio of 16 to 2, or as an aggregation of eight 1's, or four 2's, or two 4's. Further, if number be the ratio of like quantities, the ratio of two *equal* like quantities is *one*, and this one, or *unit*, is the *base* of all numbers; and, since the ratio of two *equal* like quantities is the same whatever be their quality or absolute quantity, this ratio, or one, is, in a sense, a fixed unit. Is this the "*fixed unit*" which the authors have chased through so many pages as a fundamental error in number teaching? We must confess ignorance, for though we have been dealing with numbers for many years, we have never recognized this "fixed unit theory" of number. Is it a recent philosophic discovery, or has it kept on our psychological blind-side? What is meant by the term? The unit of measurement seems to me just as much fixed as the unit of aggregation. Either may be changed at will to denote a collection or group — a new and larger unit.

Whatever may be true of the psychical nature or genesis of number, we do not see how either can *determine* the proper method of teaching number. Indeed, we are quite confident that the omission of these three thoughtful chapters would not essentially weaken the authors' suggestions respecting the teaching of number in our schools.

We fully endorse what is so clearly and strongly said respecting the radical defects of the so-called Grube method. The distinction made between addition as an aggregation process and multiplication as a ratio or factor process is clear and conclusive. The *adding* of numbers, whether equal or unequal, is addition, not multiplication, which, in its true function, is a ratio or factor process. It is true that multiplication has its genesis in addition, but this, as is shown, does not make the processes *identical*. Multiplication and division involve the idea of ratio, or factor, which is not consciously used in either addition or subtraction. The differentiation of multiplication from addition is due to the presence of this idea of ratio. We are consciously dealing with factors, and hence it is a *higher* as well as a *later* process.

We have long held that the pedagogical theory on which the Grube method is based is not sound. It is an error to treat all numbers from 1 to 100 each as an *individual* number, subjecting it to the several processes, as we would study an insect or a mineral. The practical end to be attained in primary lessons in number is not a knowledge of individual numbers, but *facility* and *accuracy* in the elementary number processes. It is a fundamental principle in pedagogy that skill in any process is not best acquired *by doing several processes simultaneously*, but by the repetition of the given process, with interest as a stimulus. This explains the failure of the Grube method when continued through two years of school. The testimony on all hands, as it comes to us, is that pupils thus trained come to the fourth school year without requi-

site facility and accuracy in the elementary processes.

But has not the Grube method had its day in American schools? The exhaustive and conclusive criticism of the method in this volume ought to hasten its exit. It is interesting to note that the "concentration" theory is rapidly unhorsing those who have been the most zealous riders of the Grube hobby. The two theories cannot be ridden abreast, or even tandem. They move in divergent directions. I have neither time nor space to refer to the remaining portion of the work, which is devoted largely to methods of teaching number. The discussion is very suggestive and full of interest. It would have been well if we had confined our review to this portion of the book. I trust, Mr. Editor, that your readers will remember that I have not attempted a criticism of this scholarly and able work. What I have written is only a record of *first impressions*, and I may as well add the frank confession that I have always found philosophic discussions of the theory of number somewhat dreary reading.

E. E. White.

George A. Walton,
Agent Massachusetts Board of Education.

Chapter I. of this book shows that psychology is a help to the teacher, by giving him some principles to guide him in applying the devices himself or another has invented, as a means of acquiring increased facility in the acquisition of knowledge, and in the exercise of faculties. To this end it indicates the psychological order of human development and the place in general of subjects taught in schools, and the special treatment of numbers as one of these subjects.

The occasion for the use of numbers is found in the demand for the measurement of quantities of various kinds. The book shows the necessity for the exercise of the powers of abstraction and generalization in coming to the true notion of numbers; that this notion is abstract and not concrete, — that the idea of number is not excited in the mind by the presence of objects, but that it is a mental activity necessitated in the process of combining into one a plurality of units.

There is an elaborate discussion of the demand of the mind for a definite unit of measurement in translating the "how much" into the "how many." The quantity measured is a defined "activity," the measuring unit "is some minor, or partial, activity, into which the original continuous activity may be broken up." A discussion follows showing the evils which arise from the use both of symbols and of objects as if they were numbers, which reaches the conclusion that operations with numbers should be treated as means to an end, which, as before stated, is measurement.

The definition of number is shown to agree psychologically with Newton's and Euler's, both of whom consider number to be a ratio. The educational application is based upon the necessity in every problem of a total magnitude, a unit which measures the whole, and a ratio, or number, existing between the two magnitudes. All numerical operations have reference to measurement of some kind of quantity, and not simply to the combining of numbers. While the authors call this combining arithmetical, and not psychological, they do recognize the necessity for accuracy in the combinations; they show how limited the combinations are, but admit that their mastery requires considerable practice.

What seems most abhorrent to them is the drilling at the start with a fixed unit, which they appear to think is essential to the Grube system, and a fundamental defect of that system. While condemning the system, they recognize one essential of it, however, the need of having a variety of operations in connection with number work — "addition and subtraction, with the incidental introduction of the more rhythmical and obvious forms of ratio, and gradual change of emphasis to the processes of multiplication and division."

The educational applications to division, to fractions, to measures and multiples, to percentage, and to evolution are treated as practical, rather than as psychological. These involve some useful suggestions in the way of analysis and the shortening of processes.

The book, as a whole, is a useful discussion of the philosophical side of numbers and their operations. The idea that the occasion for using numbers as measures for magnitude is philosophical, and enforced, as it is, by repetition, must prove valuable; this should suggest to the teacher the necessity of starting all his work with a class of units appropriate for testing magnitudes, and of using these units in practical tests which correspond. The use of such units in the application of the essential principles involved in the Grube system would seem to obviate one objection made by the authors to that system. Indeed, I see little of the development in our best schools of numbers by and through the exclusive use of the fixed unit, of which the authors make so much.

The casual reading which I have been able to give the book indicates that the authors have somewhat magnified both the extent of this usage and the danger to result from it. I am not prepared to agree with their notions, as I understand them, that ideas of number are not occasioned by objects; even the ratio idea involved in numbers must result from using a succession of units, whatever their nature, and whatever the kind of combination, whether it be uniting or separating, whether the numbers be equal, as in multiplication and division, or unequal, as in addition and subtraction. An error of some importance has crept into the book, which leads to some confusion in definition; it is the authors' failure to recognize the distinction between *number* and a *number*; the former I take to be qualitative, the latter quantitative. The two require entirely distinct definitions. The authors' conception of counting leads naturally to an error, against which they very properly take occasion to guard the teacher. Counting, as they appear to conceive of it, leads almost inevitably to naming a succession of units as if each one were a different number. To avoid this tendency, counting should be avoided in elementary number work, as is done in the Grube system.

As a philosophy, this book will aid the teacher of the science of arithmetic in making definitions and in making an analysis of the subject. Farther than as above indicated, it will not essentially affect the teaching of arithmetic as an art.

Superintendent L. H. Jones,
Cleveland, Ohio.

It is refreshing to read a book at once so interesting and so practical as "The Psychology of Number" proves to be.

In the midst of the professional clamor for correlation, we are in a possible danger of overlooking the special characteristics of subjects, thereby falling into a monotony of method which well-nigh kills the added interest which correlation is expected to excite and maintain. This beautifully sets forth the peculiarities of mathematical studies, not from a logical study of them, but from what is a much more helpful point of view, — the psychology of mathematics, — limited, however, in this case to the psychology of number. It is, perhaps, in the discussion of the nature and genesis of number notions or concepts that the book is most original and helpful; though many of the suggestions of later pages are most stimulating and thoughtful.

In the editor's preface, Dr. Harris well says: "Methods must be chosen and justified, if they can be justified at all, on psychological grounds." This is, indeed, the temper of the book throughout. If it should accomplish nothing more than the enforcement of this truth, it would justify its existence. One is tempted to make copious quotations from the editor's preface. These three sentences are nuggets of pure pedagogical gold: —

"There is such a thing as qualitative unity, or individuality." "Quantitative unity, unlike individuality, is always divisible into constituent units." "All quantity is a unity of units."

The author's preface also contains many very excellent statements of truths that are too often neglected. One quotation must suffice: —

"It is common now to divide studies into 'form' studies and 'content' studies, and to depreciate arithmetic on the ground that it is merely formal. . . .

"The pedagogical problem is not solved by railing at 'form,' but in discovering what kind of form we are dealing with, how it is related to its own content, and in working out the educational methods which answer to this relationship. Because in the case of number 'form' represents the measured adjustment of means to an end, the rhythmical balancing of parts in a whole, the mastery of form represents directness, accuracy, and economy of perception, the power to discriminate the relevant from the irrelevant, and ability to mass and converge relevant material upon a destined end; represents, in short, precisely what we understand by good sense, good judgment, the power to put two and two together."

The method followed throughout the book has constant reference to the development in the pupil of this "good sense," "good judgment," because in each case the method recognizes the constitution of the child's mind as a factor in method, and the natural development of the child as a worthy end of teaching in number.

In the chapter on the "Psychological Nature of Number" there is an excellent discussion of the two processes of abstraction and generalization, the two sides of the process by which a child constructs a number concept. It is here shown that the interest which a child takes in counting is often the pleasure of activity in abstraction; *i. e.*, abstracting attention from the sensuous elements in objects, thus doing away with their qualitative unity (individuality), and thus rendering the quantitative units capable of constituting a greater unity. The suggestions in this chapter are in line of methods for a right use of objects for first lessons in number; and show very clearly how easy it is to prevent the clear formation of number concepts by the too frequent use of incongruous objects through extended drill.

It is here shown that number is properly a relation or function of quantity, and really arises in the act of "measurement." It is clearly shown that this measurement in the beginning results from the necessary efforts at adapting means to end, — and, therefore, in the process of abstraction of the mind from all qualities except those adapted to the end, — in this case the measurement of a quantity which must be "valued," that is, measured, altogether showing in a unique way how the "quantity of multitude" arises out of the "quantity of magnitude."

These considerations form the basis for criticism of two methods of teaching, both of which have been more or less in vogue within the memory of present teachers, — the one the mere use of symbols, adding, subtracting, multiplying, and dividing, according to rule, for the sake of results, without any marked attempt at real comprehension; the other the excessive use of objects, the child performing with these objects physically the various processes of arithmetic, thus mistaking faint percepts for real number concepts.

It is possible that the criticism of the second of these is to a degree unjust, as most intelligent teachers who use the method proceed step by step till a completer process of abstraction and generalization has been fulfilled than is indicated in the criticism. Yet it is true that many teachers leave their pupils in the midst of vague perceptions, when they naturally suppose they have taught them to construct number concepts. The necessity for the use of objects in teaching number is admitted, but the plea is made for their correct use. The educational applications of the theories maintained in the book are numerous and valuable. But one cannot avoid the suspicion that some of the distinctions are too closely drawn for ordinary schoolroom practice, and that some of the processes freely criticised are assumed for this purpose in the form of their abuse rather than their use, as illustrated by our best teachers. It is interesting to notice that the "fixed unit" and the "Grube method" are not allowed to escape without their preordained drubbing. On the whole, the book serves as a tonic to the reader, and I have no doubt its study by teachers generally will result in great improvement in the teaching of numbers. It is a book to be studied, rather than merely read; and it deserves a place in the library of every thoughtful, progressive teacher. My continued study of the book has greatly intensified my first favorable impressions of it. I predict for it a wide popularity.

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OUR BOOK TABLE.

BROKEN NOTES FROM A GRAY NUNNERY. By Mrs. Julia Sherman Hallock. Boston: Lee & Shepard. Price, $1.25.

This is in no sense a tale of a convent of cloistered nuns, but rather a study of nature as seen from the beautiful country home of Mrs. Hallock. She follows the occurrences of each month, of almost each week, from January to December. No one has written more daintily of rustic scenes, bird life, plant experiences from February to November, in-door and out-door joyousness, than has Mrs. Hallock, and the publishers have set the whole in a beautiful page and illustrated it with exquisite touches by an artist.

RHYMES AND ROSES. By Samuel Minturn Peck. Holiday binding. 185 pp. Boston: Damrell & Upham. New York: Frederick A. Stokes. Price, $1.00.

Dainty little verses in delicate attire. Lyrics of nature, love-songs, verses of society, and several "In Divers Keys" make up the little volume. Out of the ordinary are "The Blue Bells," "Wild Plum Blossoms," "Elder Blossoms," "Sassafras," "Cedar Tree," and "Swamp Fancies." There are in all some seventy-five rhymes and roses beautifully printed and charmingly bound.

A BANK OF VIOLETS. Verses by Fanny H. Runnells-Poole. Cloth. New York: G. P. Putnam's Sons. Price, $1.25.

The readers of the JOURNAL have enjoyed the exquisite verses of this author in days gone by, and they will join us in expressing pleasure at the popular success attained by Mrs. Runnells-Poole. In clearness of expression, in delicacy of touch, in rhythmic grace, it is an attractive volume.

THE LIFE OF CHRIST FOR YOUNG PEOPLE. By Mary Hastings Foote. New York: Harper & Brothers. Price, $1.25.

This book is a faithful, systematic, and concise history of the life of our Saviour, every miracle, parable, and important event being given in their order, without cant or sentimentalism. The author has consulted the best authorities, and given the fruits of the latest scholarships. The method of this work is unique, the information being brought out by questions and answers, making it more definite and helpful to the student. It is especially adapted to interest young people, but will be read with profit by every class of readers. As the life of Christ is an *ideal* life, worthy the study and imitation of all classes, this book should find its way into every family and Sabbath school in the land.

WESTMINSTER. By Sir Walter Besant. New York: Frederick A. Stokes Company. Cloth. 402 pp. Price, $3.00.

A rare book to be admired and cherished. There is but one Westminster, and there will never be another. There is but one Walter Besant to set forth its historic, religious, and literary grandeur, and the Frederick A. Stokes Company has given it a beautiful letterpress, and the 125 beautiful illustrations give the pages added artistic attractions. One scarcely knows which to admire most,—the personalities enshrined, or the literary and artistic skill with which they have been honored by Mr. Besant, the author, and William Patten, the artist. From earliest times Westminster has belonged to the church. It has never had any citizens. It has no trades, no industries, no warehouses. For 500 years the court and the church, the palace and the abbey divided between them the whole of Thorney island. Westminster has had people,—a strange medley of royalty, clergy, and criminals; but no citizens, no corporate life, no united action, no purpose.

The original Thorney island was but 1,410 feet long by 1,010 feet wide, and on these four acres were abbey and palace defended by lofty stone walls. In tracing the history of this wonderful spot, Mr. Besant applies modern historic methods with much vigor, and overthrows some unimportant pet traditions; but, as a whole, he confines himself to portraying its history and associations with the order of a disciple and the art of a genius. It is a luxury to follow author and artist through these pages, as they revel in the glories of royalty and the literati.

THE SONG OF ROLAND. Retold by Arthur Way and Frederick Spenser. New York: Macmillan & Co. 62 pp. Price, 40 cents.

The authors of this little book, "a summary for the use of English readers, with verse renderings of typical passages," do not tell us that they have undertaken to do anything, or that they expect this production to be of value or service to any one in particular. Therein is its first recommendation, and the suggestion of the reason for the excellence of the result. Two thorough scholars, with a fine sense of literary and historical values, Mr. Way and Mr. Spenser have gone to work and prepared for us all a sketch of the origin of the grand old "Chanson de Roland" and of the story as it is told by the bard, telling it ably, just as they like to think of it themselves. That they know it thoroughly, is evident from the easy confidence which the reader inevitably feels in their selection of details for characterization and in passages for rendering into our vernacular. There is never a halting in the easy progress of the tale; there is no blundering through passages which must defy all attempts at smooth English versification. The song "of Charlemagne, of Roland, and of Oliver, and of the knights who died at Roncevaux," the song with which the minstrel Taillefer stirred the blood of the men who, with Norman William, stormed the Saxon lines at Hastings field and bloody hillock, is a song which no one of English fathers can ever hear without a stirring of the blood, which is, in the truest sense, the blood of the men who died for the sake of duty and honor and of a noble death in the passes of the Pyrenees; the blood which flowed on the field of Senlac, and on a thousand other fields. Students of history suggest that the aims were not always the right ones; that the ideals were not always the best ones; but we all know that the men who fought, whichever the side they were on, thought they were right, and lived or died like men. The exceptions are fully rare enough to prove the rule most surely.

It has been said that the contents of this little book render it most valuable and most pleasurable reading. Anyone who likes nice things needs only to open it and look at it to realize that the pleasure of reading is to be the greater, because it is a beautiful book, a specimen of a good book in every point of the book-lover's demand.

NOTES IN JAPAN. By Alfred Parsons. New York: Harper & Brothers. With illustrations by the author. 226 pp. Price, $3.00.

In the estimation of other nations, Japan of to-day ranks much higher than formerly. Her war with China has revealed ability and character never before understood. The eyes of the world are upon them; hence, all works on Japan or its people are of special interest. Mr. Parsons, the author of this book, is a distinguished artist. He visited this country as a critic of the race, to study its climate, productions, and the character of its people. He roamed over its fields and mountains; painted its landscapes and flowers; and profusely illustrated his book with pictures and sketches of his own creation. His copious notes are interspersed with anecdotes, which reveal the character and genius of the people. The book is in the best style of its distinguished publishers, and is a valuable accession to the literature of Japan.

DR. MILLER'S YEAR BOOK. A year's daily readings. By J. R. Miller, D.D. New York: T. Y. Crowell & Co. Holiday attire. 366 pp. Price, $1.25.

This is one of the best of devout works. In it are 365 texts, set with rich extracts, fascinating illustrations, and pertinent anecdotes.

ELEMENTS OF GEOMETRY, PLANE AND SOLID. By John Macnie. Edited by Emerson E. White. New York: American Book Company. Cloth. 370 pp. Price, $1.25.

For an exact science, geometry in these days succeeds in finding many ways of presenting itself at the hands of skillful authors and editors. But one thing remains exact through all these variations: he who would make a good text-book in geometry must be a skilled mathematician and an earnest believer in science of number. Both Mr. Macnie and Dr. White meet these requirements. They believe that geometry presents the only opportunity for strict reasoning that most of the students will ever enjoy, and they treat the subject with all the ardor that such belief implies. The definitions are exact, clear, and logical. The whole influence of the book is vigorous, toning up the mind with great energy. It assumes nothing that is not literally self-evident. It establishes everything with a view to its permanent usefulness.

MONEY AND BANKING, ILLUSTRATED BY AMERICAN HISTORY. By Horace White. Boston: Ginn & Co. Cloth. 488 pp. Price, $1.50.

Mr. White is an economist with convictions, wields a vigorous pen, knows a multitude of facts, and sets forth his convictions, through facts, with great vigor. He thinks the government of the United States has been toiling in a financial wilderness since February 25, 1862, because it then made paper money legal tender between individuals.

He begins with civilized life as it was originally on this continent, and comes down the ages with the money changes. He sets forth graphically the struggles of various ages with its money problem. The book is not devoid of humor. It is a book that must be read by novice or expert who purposes to keep track of the economic advance of the day, as well as by those who wish to feel even more reliant in their faith in financial verities.

THE PLAGUE. By Daniel Defoe. Edited and annotated by George Rice Carpenter. English Classic Series. New York: Longmans, Green, & Co.

Why has "The Plague" had such a revival? This is the third house that has produced it within a few weeks, but this is an especially attractive form of that doleful recital of one of the world's great calamities. It is so graphically told, however, that it is an English classic in very truth.

LA FILLE DE ROLAND. Theatre Contemporain Series. By W. L. Montague. New York: W. B. Jenkins. Paper. Price, 25 cents.

Although not well known in America, "La Fille de Roland" was immensely popular upon its production in Paris in 1875, and upon its second appearance recently. The pictures of manners and customs exhibited are in perfect harmony with the historic life of France. Love of country is the very soul of the work, and breathes in every line. This edition has been prepared to awaken greater interest in the work and in the history of the time described. The notes are designed, partially, as a means of a more thorough acquaintance with the nature and use of the language, its etymology and syntax. The text has been made a basis for a study of grammar, though no reference has been made to a particular grammar, the subjunctive mode being an object of special attention.

HOW TOMMY SAVED THE BARN. By James Otis. Boston: T. Y. Crowell & Co. 8vo. With frontispiece. Ornamental. Price, 50 cents.

Mr. James Otis of Portland, Me., is rapidly taking high rank as a popular writer for children. "How Tommy Saved the Barn" tells of the arrival and sojourn at a Maine farm of three little city waifs. The story will specially appeal to those who are interested in the beneficent work of the "Fresh-Air Fund."

HENRY T. COATES, Philadelphia, issues "Adrift in the City; or, Oliver Conrad's Plucky Fight," by Horatio Alger, Jr. (325 pp.), a fascinating story of city life.

LEE & SHEPARD, Boston, issue in "The Hazelwood Stories Series," "Little Daughter," by Grace LeBaron. 78 pp. Price, 75 cents.

ONE of the most attractive holiday volumes will be "Folia Dispersa," the collected poems of William Cranston Lawton, with outline illustrations by Caroline S. King. About half the poems are now printed for the first time. The book will be out not later than December 10.

HOUGHTON, MIFFLIN, & Co., Boston, issue in attractive binding Helen Dawes Brown's "Little Miss Phœbe Gay," illustrated by S. J. F. J., for little girls who enjoy a vivacious story.

FREDERICK A. STOKES COMPANY, New York, issue "Toxin," a story of Venice, by the famous Ouida. Illustrated by Louise L. Heustis. 220 pp. Price, 75 cents. This company has made a decided hit in their holiday books of '95, not only in the fame of their writers, but in the size, type, and binding of this Twentieth Century series. Although the price is but fifty cents — in one or two cases seventy-five cents — they have given in most attractive type a reading page of 2x4 inches, in a unique binding. Already there are ten books in this series by such writers as Robert Barr, John Mackie, W. Clark Russell, F. Frankfort Moore, John Strange Winter, Robert Buchanan, and Ouida.

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BOOKS RECEIVED.

MOLIERE'S LES PRECIEUSES RIDICULES. Edited by Marshall W. Davis. Price, 85 cents. Boston: Ginn & Co.

PROBLEMS IN THE USE AND ADJUSTMENT OF ENGINEERING INSTRUMENTS. By Walter Loring Webb. Price, $1.00. New York: John Wiley & Sons.

CONSTANTINOPLE. By Edwin A. Grosvenor. Price, $10.00. Boston: Roberts Brothers.

THE FIRESIDE ENCYCLOPÆDIA OF POETRY. Collected and arranged by Henry T. Coates. Price, $3.50. Philadelphia: Porter & Coates.

THE MINUTE MAN ON THE FRONTIER. By Rev. W. G. Puddefoot. Price, $1.25. New York: T. Y. Crowell & Co.

THE STORY OF WASHINGTON. By Jessie R. Smith. Santa Rosa, Cal.: Republican Printing House.

FABLES AND ESSAYS. By John Bryan. New York: The Arts & Lettres Co.

ESSAYS IN ENGLISH LITERATURE. By George Saintsbury. Price, $2.00.——ENGLISH PASTORALS. Selected by Edmund K. Chambers. Price, $1.50.——A MANUAL OF GREEK ANTIQUITIES. By Percy Gardner and Frank Byron Jevons. Price, $4.00. New York: Charles Scribner's Sons.

DANIEL WEBSTER'S BUNKER HILL ORATION, AND OTHER ADDRESSES. Edited by Fred Newton Scott.——MACAULAY'S ESSAY ON MILTON. Edited by James Greenleaf Croswell. New York: Longmans, Green, & Co.

CAPTAIN ANTIFER. By Jules Verne. Price, $1.25.——A GIRL OF THE COMMUNE. By G. A. Henty. Price, $1.25. New York: R. F. Fenno & Co.

DAS DEUTSCHE ORDENSLAND PREUSSEN. Edited by W. S. Lyon. Price, 40 cents.——MACAULAY'S HISTORY OF ENGLAND (Chap. I.). Price, 25 cents.——MERRILL'S VERTICAL PENMANSHIP, Nos. 1 and 2. New York: Maynard, Merrill, & Co.

NATURE SONGS FOR LITTLE SINGERS. By N. B. Sargent. Cincinnati: The John Church Co.

ELFIE AND THE KATYDID. By Frances V. and Edward J. Austen. Price, $1.25. New York: The Merriam Co.

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NEW ENGLAND ASSOCIATION OF SCHOOL SUPERINTENDENTS.

The fifty-seventh meeting of the New England Association of School Superintendents was held in the English high school, Boston, November 15, with a large attendance.

"Slant or Vertical Writing" was the first subject taken up for discussion. Miss Anna E. Hill, superintendent of penmanship in Springfield, advocated the so-called vertical writing. In England and Austria medical authorities made the discovery that sloping writing was conducive to curvature of the spine.

J. M. Graves, supervisor of penmanship in the Lowell public schools, read a paper advocating and defending slanting writing. He said: "Writing in this country has not deteriorated. To-day there are ninety-five teachers of penmanship in this country where there were five fifty years ago. And among them there is not one who favors vertical writing. Public schools are not expected to turn out full-fledged lawyers and doctors; then why should they be expected to turn out full-fledged penmen. I have taught penmanship in the Lowell schools for twelve years, and in all that time I do not recall half a dozen cases of abnormal curvature of the spine." Mr. Graves said that even Professor Shaler, who wrote a text-book on vertical writing, now denounced it as a fad; also that vertical writing is denounced by merchants.

"The Present Status of Nature Study" was discussed by Arthur C. Boyden of the Bridgewater normal school. He said that nature study had come to stay, and had begun its upward course.

Henry T. Bailey continued the discussion. He said that there were three classes of children studying nature. The first knew almost nothing of nature. The second knew of nature only Latin names, while the third saw in nature beauty. One-half of the towns in the state do something in nature study, but as they comprise the larger cities and towns they comprise seventy-five per cent. of the children in schools.

A new constitution was recommended providing for a central organization with two departments, one for the country superintendents and one for city superintendents, with one annual meeting for both departments, and semi-annual meetings for each department separately.

A minority report dissented on the ground that the broad interests of education were alike both in city and country. It was ordered that both reports be printed and referred to the next meeting.

Louis P. Nash of Gardner proposed the question of consolidating with the Massachusetts' Association of Teachers. Mr. Seaver of Boston advocated the union as a step in the right direction, and the whole matter was referred to the next meeting.

L. H. Jones, superintendent of the public schools of Cleveland, O., opened the afternoon discussion on "Educational Miscellany." He said: "Our great study is how to teach. Teaching transforms and makes character. Teaching may be more than, or nothing but, an art. Its purpose is to perfect the character of the pupil, and this is to be brought about through the proper acquisition of scholarship and training. Every teacher must keep in mind the distinction between interesting and amusing pupils. The former is legitimate, but the latter is the refuge of pedagogical characters. Each day in the school life should mark a step in advance. The school exists for the pupil, and not for the teacher, and this should be borne in mind."

The committee on nomination recommended Hon. Mason S. Stone for president, and he was unanimously elected.

NORTHEASTERN IOWA EDUCATIONAL ASSOCIATION.

The meeting at Charles City October 17, 18, and 19 was as much a success as could be desired, though the attendance was smaller than at Waterloo, owing to the inaccessibility of Charles City. The arrangements for the meeting were all that could be desired, and the hotel and boarding accommodations excellent. The hospitality of the people was thorough and cordial. D. W. Walker and Superintendent Dick looked after the local arrangements in good shape. The papers read were of excellent quality and admirable tone, and the discussions free.

On Thursday evening, at the opening of the meeting, Mr. A. C. Ross of the Osage school was absent, on account of jury duty. A. R. Sale of Mason City read a very excellent paper, which called out a lively discussion. Superintendent C. S. Cory followed him with a good paper.

In the evening all the speakers on the programme from Charles City were on hand and gave the association a hearty welcome. Professor J. C. Yocum, formerly of Charles City, later of Cherokee, and well known to the teachers of Iowa, spoke for Mr. Hildreth, who was disabled by a severe cold, although he was present on the stage. The president's address by W. D. Wells of Grundy Centre was a well-written address, setting forth the immediate needs of the schools in a stirring and impressive manner.

Friday morning the children of the Charles City schools gave the association some excellent specimens of their training in music. The exercises of the morning were carried out according to the programme. The papers were pointed and brief, and gave room for full and free discussion.

The paper by Captain W. H. Holman, in the afternoon, was discussed by Rev. W. W. Gist of Osage. The audience enjoyed both the paper and discussion. The paper on "The Teacher Supply Problem," by Superintendent Sheakley, was very warmly received. A request was made that the educational papers publish it.

Friday evening was marked by two excellent and inspiring addresses—one on "Child Study" by Dr. W. O. Krohn of Illinois State University, and the other by Miss Sarah C. Brooks, supervisor of primary schools, St. Paul. Dr. Krohn is an enthusiastic advocate of child study and believes it is destined to revolutionize the treatment of children. He spoke of defective sight and hearing and the effect upon work, of the inequality in growth of the different parts of the body at the same period, of the relative growth and development of boys and girls at different ages, and the difference in treatment required. Dr. Krohn would abolish all those exercises requiring accurate and painstaking figure work in the lower grades.

Miss Brooks continued the thought of Dr. Krohn, but put it upon a different basis. She believes in consulting the instincts of the child; would introduce the play element into school work wherever practicable. Both of those addresses were much enjoyed.

On Saturday morning the association gathered to hear a paper from Mr. E. O. Vaile of Oak Park, editor of the *Intelligence*. Mr. Vaile's subject was "How to Prune and Enrich Our Course of Study." Those who knew Mr. Vaile, and there were many in the audience, were expecting a treat, and thought there would be some sharp thrusts at school idols from this vigorous and fearless writer. It *was* a treat and there were home thrusts, but Mr. Vaile did not arouse antagonism in the way some thought he would, and though the discussion which followed was lively, the trend of it showed that for the most part the audience agreed with Mr. Vaile's position. Following this paper there were several Round Table meetings numerously attended.

The officers for the next year are as follows: *President*, F. H. Bloodgood, West Union; *Vice-President*, G. A. Bateman, Waterloo; *Secretary*, Belle Hannah, Hampton; *Treasurer*, A. R. Sale, Mason City; *Chairman Executive Committee*, J. J. Dofflemeyer, Marion.

The next place of meeting is still undecided, being left to the executive committee for selection. But two places were proposed, Dubuque and Cedar Rapids, and Dubuque will, in all probability, be chosen, although the committee will decide that point.

As They Saw Us.

Never in her history has Charles City had the honor of greeting and entertaining a brighter or more intelligent body of men and women than those who graced the city by their presence last week, as members of the Northeastern Iowa Educational Association. Fully six hundred were present, each and every one of whom showed an interest and an earnestness in the business in hand which stamped him or her as a true and devoted disciple of the cause of education. And not only was their devotion to the cause of education shown by the interest and earnestness manifested by them, but it was proven in their discussions, many of which the writer of these lines had the very great pleasure of hearing. Too often in meetings of this character is the practice of mutual self-laudation indulged in to a degree that deprives them of almost all their possible and intended good. But of this meeting it can be truly and proudly said that nothing of the kind entered into the speeches, papers, or discussions. Nor, on the other hand, was the practice of self-condemnation indulged in, as is sometimes the case. There seemed to be no spirit or desire for fulsome self-laudation nor gloomy self-condemnation, but all and each seemed to be possessed with the one desire to receive and impart as much of the good and useful information as possible. One thing that impressed the onlooker more than anything else was the utter refutation of the charge frequently made that teachers have no interest in their work beyond the salary they are able to command. Not only was this charge proven to be untrue by the utterances of the teachers themselves, but it is so proven to any reasonable man, when he considers the meagre salaries paid to teachers, by the fact that they continue in the work. — *Charles City Citizen*

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EDUCATIONAL INTELLIGENCE.

MEETINGS TO BE HELD.

Dec. 7: New England Conference of Educational Workers, Boston.
Dec. 26–28: Indiana State Teachers' Association, Indianapolis (State House).
Dec. 31–Jan. 1–2: Southern Educational Association, Hot Springs, Arkansas.
Dec. 31–Jan. 1–2: Western Arkansas State Teachers' Association, Hot Springs, Ark.
Dec. 25–27: Kansas State Teachers' Association, Topeka, Kan.
Dec. 25–29: Illinois State Teachers' Association, Springfield, Ill.
Dec. 26–28: Wisconsin State Teachers' Association, Milwaukee, Wis.
Dec. 26–28: North Central Missouri Teachers' Association, Salisbury, Mo.
Dec. 26–28: Southwest Missouri Teachers' Association, Carthage, Mo.
Dec. 26–28: Northeast Missouri Teachers' Association, Mexico, Mo.
Dec. 26: Montana Council of Educaiion, Anaconda, Mont.
Dec. 26–27: Southeast Missouri Teachers' Association, Poplar Bluff, Mo.
Dec. 26–28: Maine Pedagogical Society, Bangor, Maine.
Dec. 26–30: Western Penman's Association, Chicago, Ill.

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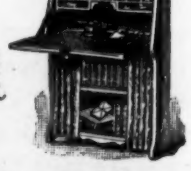

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MASSACHUSETTS.

The annual meeting of the New England Conference of Educational Workers will be held in the English high school building, Boston, on December 7, at 9.30 A. M. *Programme:*

Business; programme, in charge of committee on general education, subject, "Geography." Addr ss: "The Study of Geography in Germany," Mr. Will S. Monroe. Address: "Some Characteristics of the New Geography," Mr. F. F. Murdock.

During the intermission and after the session there will be an exhibition of geographical aids and appliances in the drill hall. The object of this exhibition is to show the great amount and variety of material available in connection with what is known as the "New Geography," and it will consist of maps, charts, globes, casts, pictures, books, lanterns, etc.

Afternoon session at 1 o'clock. Address: "Nature Study as a Preparation for Geography," Mr. Arthur C. Boyden. Address: "Nature Study and Geography," Mr. Charles B. Scott, Oswego, N. Y.

The Brookline Education Society is really the most complete association of the kind of which we have yet learned. Membership is only secured upon a written application and the payment of a membership fee. The membership is already more than 300. The JOURNAL has noticed the course of lectures to be given by eminent talent, a large number of tickets to which have been sold at $1.50 for the course, and last Monday evening the society held a reception, for which some $200 was easily raised among the members. The superintendent, S. T. Dutton, and the members of the school board are among the prime movers. The influence upon educational sentiment cannot be estimated.

A complete catalogue of the English and classical school at West Newton, of which the Allen brothers are proprietors and principals, has just been published. It is a work of unusual interest and value. It contains a list of over 4,000 pupils who have been connected with this famous school since the days of Horace Mann. It has a brief biographical sketch of the teachers and almost every one of the alumni of the school. It is a model volume of its kind, containing photographs of former teachers, including Father and Mrs. Pierce and all the Allen family who have been connected with this great private school for the past fifty years. The work of preparing this catalogue has been performed by Mr. Eugene F. Fay of Brookline. The preparation required a period of six full years, as it was necessary to send out many thousands of letters and circulars in order to gather the information required for this admirably executed volume.

At a meeting of the Eastern Association of Physics Teachers, held in Brookline on November 9, an important communication was received from Harvard University respecting the admission requirements in physics. There has long been a feeling on the part of the authorities at Cambridge, as well as among teachers in secondary schools, who have occasion to prepare pupils for the examination in physics, that the requirements for admission need revision. Such revision is being made, and this association of teachers has been invited to offer suggestions. A committee of five, from as many representative schools in the association, has accordingly been appointed to prepare a report for the next meeting, which shall embody such suggestions as they may deem wise to offer. The final report of the association will be made to the university at a later date. In their effort to secure equitable requirements, and to devise a course of laboratory work which shall meet with the approval of everyone concerned, this committee desires the hearty coöperation of all who are in any way interested in this most important work. Since the physical laboratory work in secondary schools is rapidly becoming of such increasing importance, its value being recognized by all, and since Harvard University has taken the lead in outlining a definite preparatory course, the importance of the contemplated revision is obvious. All teachers who are interested in this matter, and desire to present their views to the Association of Physics Teachers, are invited to communicate with the secretary, A. B. Kimball, English high school, Worcester. Committee: Chairman J. C. Packard, Brookline high school; Secretary A. B. Kimball, Worcester high school; H. J. Chase, Cambridge Latin school; William B. Graves, Andover Academy; F. M. Gilley, Chelsea high school.

NEW YORK.

The Brooklyn pension law, to which the teachers of the city are largely indebted to Principal L. F. Lewis of grammar school No. 11 and the committee of which he was chairman, is working very well. More than 1,500 teachers petitioned the Brooklyn board of education to take an active part in securing its passage by the legislature.

Miss Ella Gale will become a teacher in the Cortland normal as soon as her term expires as school commissioner, December 31.

George E. Ryan, a Cortland graduate, for some time superintendent of schools in Weston, Ohio, has gone to Caddo, Indian Territory, to organize a public school system there.

Professor Nicholas Knight, formerly of Cazenovia Seminary, is now professor of sciences in Randolph-Macon University.

Troy taxpayers have appealed to the state superintendent of public instruction from the action of the board of education of West Troy, in hiring St. Bridget's parochial school building and appointing eight teachers, six of whom are sisters in a religious order and reside in St. Joseph's convent.

PERSONALLY-CONDUCTED TOURS via PENNSYLVANIA RAILROAD.

The Pennsylvania Railroad Company announces the following personally-conducted tours for the season of 1895–96:—

Two tours to California and the Pacific Coast will leave Boston February 11 and March 10, 1896. Four weeks in California on the first tour, four and a half weeks on the second. Stop will be made at New Orleans for Mardi-Gras festivities on first.

Tours to Washington, D. C., via all rail, December 26 and April 6. The rate for the first-mentioned tour, covering a period of five days, will be $26, and for the second, covering four days, $23; also tours via Fall River Line between Boston and New York in each direction, thence rail, January 20, February 17, March 16, and May 4, each covering a period of five days, at $23 for the round trip. The above-named rates include transportation, meals *en route*, accommodations at the best hotels in Washington, transfers, and all necessary expenses.

Tours to Jacksonville, Fla., allowing two weeks in the "Land of Flowers," will leave Boston January 27, February 3, 10, 17, and 24, and March 2, 1896. Rate, covering Pullman accommodations and meals *en route* in both directions, $65.00.

Tours to Old Point Comfort, Richmond, and Washington will leave New York December 26, 1895, Jannary 23, February 20, and March 12, 1896.

Detailed itineraries will be sent on application to Tourist Agent, 205 Washington street, Boston, Mass.

WINTER EXCURSION TICKETS ON THE PENNSYLVANIA ROAD.

On November 1 the Pennsylvania Railroad Company placed on sale at its principal ticket offices excursion tickets to all prominent winter resorts in New Jersey, Virginia, North and South Carolina, Georgia, Florida, and Cuba. The tickets are sold at the usual low rates.

The magnificent facilities of the Pennsylvania railroad, with its many connections, make this the favorite line for winter travel.

An illustrated book, descriptive of winter resorts, and giving routes of travel and rates for tickets, will be furnished free on application to George M. Roberts, Passenger Agent N. E. District, 205 Washington street, Boston.

N. E. A. FOR 1896.

Secretary Irwin Shepard of the N. E. A. issues the following official bulletin:—

The executive committee of the N. E. A., after careful consideration, have unanimously selected Buffalo, N. Y., as the place for the next annual meeting, July 7–11, 1896. This decision is subject to the following conditions:—

First, That the Trunk Line and Central Traffic Associations take official action by December 20th, 1896, granting round trip tickets from all points in their territory for one lowest first-class fare. These round trip tickets to be good until September 1, 1896.

Second, That said associations, also, will sell to members of the N. E. A. at the close of the meeting tickets to all points on the Atlantic coast and in Canada at the lowest excursion rates for the round trip; tickets good until September 1, 1896.

The desire of the committee has been to locate the meeting in Boston in accordance with the almost unanimous wish of the directory, expressed by letter. It was, however, impossible to secure from the New England organization of railroads better rates than one and a third fare for the round trip. The committee also found that the rate made by the terminal lines would govern all other railroad organizations. It is believed that the selection of Buffalo most nearly meets the expressed views of the directory.

The Denver volume is nearly completed, and it is expected that it will be sent to members before January 1, 1896. It promises to be equal in all respects, and in some particulars superior, to any volume yet issued.

In addition to the proceedings of the Denver meeting, the volume will contain the proceedings and addresses at the opening of the educational congresses at the Atlanta exposition, held under the auspices of the N. E. A., October 25 and 26. These addresses are of unusual interest and value.

The new list of active members will appear in this volume, including all who become active members at the date of going to press.

All who desire to become active members are urged to apply *immediately* to the secretary, Irwin Shepard, Winona, Minn., that their names may be included in this first published list.

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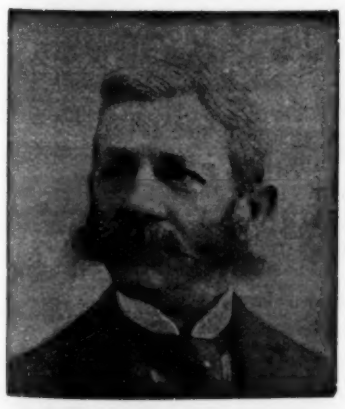

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THE MAGAZINES.

—*Scribner's Magazine* for December is most decidedly a Christmas number in the charming illustrations and also in the character of the articles. We commend the idea of a history serial to be commenced in the New Year's number. We learn that it is to deal with the history of the government during the first administration of Grover Cleveland, beginning in 1884. The illustrations of this history have been collected with the utmost care, and form practically a pictorial history in themselves. There are also other new departments to be introduced with the opening of 1896; one will be devoted to topics of present-day interest, and another will touch upon art topics and pictures, which represent what is new and important. "The Point of View" will be continued as usual. The artists and authors represented in the December number are: "A. Lepère (who drew and engraved the frontispiece), "Dotre de Paris at Sunset"; Cosmo Monkhouse, George Meredith, Henry Van Dyke, Charles Edwin Markham, Captain C. J. Mellis (Ninth regiment, Bombay infantry), Frank R. Stockton, Charles E. Carryl, M. L. Van Vorst, Arthur Stanwood Pier, Elizabeth C. Cardozo, George De Clyver Curtis, Joel Chandler Harris, Edward S. Martin, Brander Matthews, and A. E. Watrous. Price, $3.00 a year; single copy 25 cents. New York: Charles Scribner's Sons.

—The Christmas number of the *New England Magazine* is rich in its contents, and beautiful in mechanical execution. "The Story of Christmas Christianity," by Edward Everett Hale, is the sub-title of the tale "From Generation to Generation." It is in the author's best vein. "One Touch of Nature," by Lucian Child; "The Midshipmite," by Mrs. Searing; "The Shadow on the Red House," by Frederick H. Cogswell, and other stories in the number are all instinct with a strong humanitarianism. "The Builder of the Old South Meeting-House." Mr. Abram Brown shows the builder to have been one Joshua Blanchard, and the photographs of the cornerstone of the meeting-house, and the other illustrations which help him establish his point, will be looked at with interest by all our antiquarians. "A Middle-Aged Woman" is a story by the late Robert Beverly Hale, sent to the magazine just before his fatal illness. It is a story of a more distinctly social reform character than anything which has before appeared from the pen of the talented young writer. It is accompanied by a fine portrait of Mr. Hale, taken during the period of his life as a Harvard student, and is thus given an added memorial value. Under the title of "The Painter of 'Yankee Doodle,'" Mr. James F. Ryder of Cleveland tells the interesting story of his life. The painter was Archibald M. Willard. "The Kindergarten for the Blind" is described by Miss Dinah Sturgis. Its work is a noble one, and the article is illustrated charmingly. Price, $3.00 a year; single copies, 25 cents. Boston: 5 Park square. Warren F. Kellogg, publisher.

—The December *Forum* contains a very valuable opening article by M. Paul Leroy-Beaulieu, the French political economist, entitled "Conditions for American Commercial and Financial Supremacy." From the point of view of a sympathetic European observer, M. Beaulieu discusses the financial problem now confronting the United States government, and points out its only possible solution. Theodore Roosevelt writes about "Thomas Brackett Reed and the Fifty-first Congress," describing the conditions which confronted Mr. Reed when speaker of that congress. Mr. Glen Miller, a resident of Salt Lake City, asks, "Has the Mormon Church Re-entered Politics?" and says it has not. Mrs. Margaret E. Sangster of *Harper's Bazar*, contributes a very interesting paper on "Editorship as a Career for Women." Mr. Alfred C. Cassett writes about "The Monroe Doctrine," contending that the occasion which called it forth has long since passed away and that it is now practically inoperative. President William De Witt Hyde, of Bowdoin College, writes on "The Pilgrim Principle and the Pilgrim Heritage." Other articles are "Thomas Carlyle: His Work and Influence," by Mr. William R. Thayer; "The Ethics of Party Loyalty," by George Walton Green; and "Crime Among Animals," by Mr. William Ferrero, a young Italian criminologist. The number closes with a reply to his critics by the author of the "Confessions of a Literary Hack," which appeared in the July *Forum*. Price, $3.00; single copy, 25 cents. New York: The Forum Company.

—The most important feature of *St. Nicholas* for December is a selection from letters written by Robert Louis Stevenson, dated at his plantation "Vailima," to young friends in England. These have an introduction and notes by Mr. Stevenson's step-son, Lloyd Osbourne. The letters have the charm that attaches to everything the author wrote, and they give a vivid picture of the romantic phases of his life in Samoa. The entire number of the magazine is redolent of Christmas and the holiday season. A former friend of the little ones is introduced again in Sarah Orne Jewett's story, "Betty Leicester's English Christmas," the first part of which is printed. Several Christmas poems will appeal to many readers. "The Dream March of the Children," by James Whitcomb Riley, is in the very best vein of the Hoosier poet. Mrs. Constance Cary Harrison contributes a reminiscence of her girlhood days in Richmond during war times, under the title of "The Little Carltons Have Their Say," while George Parsons Lathrop gives a glimpse of his boyhood in "Our Secret Society." The serials present the usual interesting installments.

—The December number of the *Catholic World Magazine* is a Christmas issue. It contains a variety of seasonable matter, in addition to more solid contributions. Rev. John B. Tabb furnishes a very graceful Christmas poem. Three Christmas stories of high interest are given—the respective authors being Rev. John Talbot Smith, Walter Lecky, and Helen M. Sweeney. It deals trenchantly with the latest literature, light as well as serious, of the day, and will be found an invaluable guide in the selection of wholsome reading.

—The Thanksgiving *Babyland* begins the new volume in a very taking way. Its Thanksgiving story, "The Candy Turkey," with its cute little pictures and the beautiful big frontispiece, will please the nursery listeners immensely. Some new diversions for the very little folks and mama are opened up by "A Pint of Peanuts." This one, the first of a series, shows how to make a chicken, a squirrel, and boats of peanuts. The first of a notable and delightful series, "Baby's Birthday Songs," by Grey Burleson, is given, and one of its two pages of beautiful pictures shows the Baby of November riding forth behind a span of gorgeous turkeys. It is very apparent that the forthcoming volume of *Babyland* will be full of enchantment for the nursery folks and mama. 50 cents a year. Boston: Alpha Publishing Company.

—The contents of the *Magazine of Art* for December are: "Country Cousins," by Jean Aubert, a photogravure, as frontispiece; "The Silver Thames," original etching by Francis Walker; "Study," by P. J. A. Baudry; "Some Portraits of Sir Walter Scott," by F. G. Kitton, with six illustrations; "The Place of Sculpture in Daily Life: Decoration," by Edmund Gosse, with a headpiece and an illustration; "Pas de Quatre," poem by Cosmo Monkhouse, with an illustration; "Charles Burton Barber," by Harry Furniss, with portrait of C. Burton Barber, and six illustrations; "A Collection of Plate Belonging to Sir Samuel Montague, Bart," by Frederick S. Robinson, with eight illustrations; "Art in the Theatre: The Development of Spectacle, as Exemplified in the Ballet of Faust," by M. H. Spielmann, with fourteen illustrations; "A Note on the Cartoons of Ford Madox Brown," with two illustrations; "Professor Herkomer, R.A., and His Pupils," by M. Phipps Jackson, with five illustrations; "Recent Illustrated Volumes," with three illustrations, and "The Chronicle of Art," with seven illustrations. It opens a new volume and illustrates admirably the progress of art, with exquisite illustrations. Price, $3.50 a year. Single copy, 25 cents. New York: Cassell & Co., Union square.

—The December number of *Godey's Magazine* is notable with Yule-tide fiction and verse, besides such seasonable articles as "Holiday Decorations," "Christmas, Past and Present," and "Christmas Day in a Japanese Go-Down." Perhaps the chief feature of this number is, however, an extensive account of the great "Federation of Women's Clubs," a forerunner of the January issue, which is to be a special "woman's number." The liberal space given to the fashion department is always notable. New York: The Godey Company.

MAGAZINES RECEIVED.

Annals of the Academy of Political and Social Science for November; terms, $6.00 a year. Philadelphia.

The *Magazine of Art* for December; terms, $3.50 a year. New York: Cassell & Co.

The *Strand Magazine* for December; terms, $1.50 a year. New York: International News Co.

St. Nicholas for December; terms, $3.00 a year. New York: The Century Company.

Ladies' Home Journal for December; terms, $1.00 a year. Philadelphia: Curtis Publishing Company.

Harper's Monthly Magazine for December; terms, $4.00 a year. New York: Harper & Brothers.

The *Badminton Magazine of Sports and Pastimes* for November; terms, $3.50. New York: Longmans, Green, & Co.

Jenness Miller Monthly for November; terms, $1.00 a year. New York.

Lippincott's for December; terms, $3.00 a year. Philadelphia.

Outing for December; terms, $3.00 a year. New York.

Catholic World for December; terms, $3.00 a year. New York.

Godey's Magazine for December; terms, $1.00 a year. New York.

The *Pansy* for November; terms, 50 cents a year. Boston: Alpha Publishing Company.

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The readers of this paper will be pleased to learn that there is at least one dreaded disease that science has been able to cure in all its stages, and that is catarrh. Hall's Catarrh Cure is the only positive cure known to the medical fraternity. Catarrh, being a constitutional disease, requires a constitutional treatment. Hall's Catarrh Cure is taken internally, acting directly on the blood and mucous surfaces of the system, thereby destroying the foundation of the disease, and giving the patient strength by building up the constitution and assisting nature in doing its work. The proprietors have so much faith in its curative powers, that they offer One Hundred Dollars for any case that it fails to cure. Send for list of testimonials.

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TWO NEW WORKS.

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They also announce for publication a work on "Experimental Morphology," by Charles B. Adams, Ph. D., instructor in zoölogy at Harvard. It brings together under appropriate heads the published observations hitherto made on the subject, laying especial stress upon the results and methods of those investigations which have a quantitative value. The central idea of the work is that ontogeny is, largely at least, a series of reactions to chemical and physical agents. This determines the scope of the work, and the division of the effects of agents under the heads: I. Protoplasmic Movements; II. Nuclear Division; III. Growth; IV. Differentiation.

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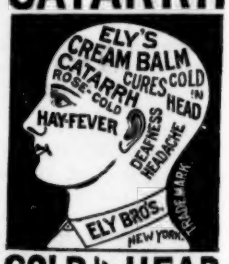

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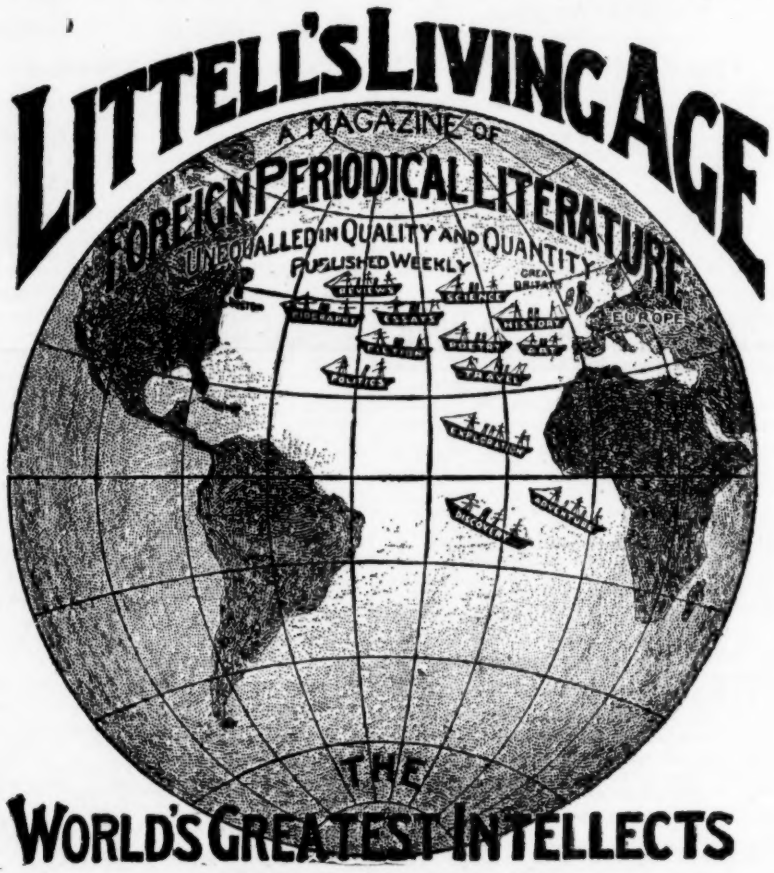

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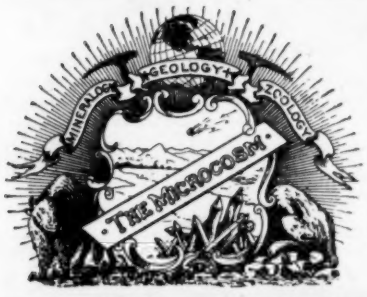

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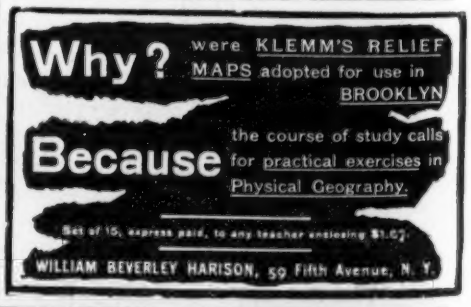
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